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SHARED APERTURE BREADBOARD TEST SYSTEM (SABTS) LASER SUPPORT

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December 1978

Final Report

Approved for public release; distribution unlimited.



AIR FORCE WEAPONS LABORATORY Air Force Systems Command Kirtland Air Force Base, NM 87117

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Deuterium Fluoride (DF) High Energy Laser (HEL) su	
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Breadboard Test System (SABTS). The TRW Baseline	Demonstration Laser (BDL) HEL
facility was modified for SABTS, and laser support	
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Section I

INTRODUCTION

The objective of the overall Shared Aperture Breadboard Test System (SABTS) program was to test predicted survivability levels and to measure performance characteristics of dichroic beam splitter samples in an intense 3.8 µm deuterium fluoride (DF) high energy laser (HEL) beam. These samples were developed for an aperture sharing device which will separate an outgoing laser beam of high intensity from incoming tracker light signal of low intensity and of different wavelength. The shared aperture will reduce complexity and improve system performance of future tracker systems.

The TRW contribution to the SABTS program was to provide HEL support for the SABTS experiments. Other portions of the total experiment were provided by two additional contractors. Ford Aerospace and Communication Corporation (FACC) built and maintained the SABTS equipment. The University of Dayton Research Institute (UDRI) operated the SABTS equipment and collected test data. The Air Force Weapons Laboratory (AFWL) provided the test specimens and coordinated all testing activities. The responsibilities of the various participants in the SABTS program are summarized in table 1.

The TRW baseline demonstration laser (BDL) HEL facility was modified to accept these experiments. This involved a somewhat extensive redesign and restructuring of the optical train, and renovation of the vestibule area of the BDL building. Extensive soundproofing, painting for cleanliness, and installation of a filtered blower were required to provide a positive pressure clean-air facility with tolerable vibrations for the SABTS test tables. Further changes involved the design and fabrication of the supporting optical train, modifications to existing facilities, and integration of the BDL device into the total SABTS test configuration.

Power levels were measured for each of the runs, so that when combined with the magnification settings of the beam conditioning system, intensities incident on the samples could be determined.

Table 1. PROGRAM PARTICIPANTS

CONTRACTOR CONTRIBUTION	
TRW	Provide test facility, DF HEL laser beam, measurement and monitoring of beam power, profile and alignment, data control and monitoring signals, TV coverage, consultation on testing, and technician support.
FACC	Fabricated, assembled and installed the SABTS including beam conditioning and sample testing apparatus and continued support to the tests.
UDRI	Provided test planning and execution, data collection, analysis and reporting.
AFWL	Provided test samples, overall management, administration, and coordination of entire program.

The program was divided into three sequential phases. In Phase I:

- The TRW BDL site was modified and prepared to accept the SABTS.
- SABTS apparatus and equipment was installed and integrated with facility.
- Startup and alignment of the BDL device to the SABTS was achieved.

In Phase II, the BDL HEL facility was operated to support:

- Acceptance testing of the SABTS.
- Coating survivability tests in the HEL beam.

In Phase III, the BDL HEL was operated to support:

- Optical evaluation of the SABTS samples.
- Supplementary Effects Tests outside the SABTS test area.

The objectives of each plan were met successfully. In particular, the completed test configuration demonstrated the power, beam characteristic and beam control capabilities that were specified for Phase I. In addition, the program test objectives (number of runs, samples tested, and total lasing time) of Phase II and III were also completed. These results are outlined in the various sections on program objectives, test configuration, and test data. All raw data has been included in an appendix with a discussion of the pertinent results included in Section V.

Section II

PROGRAM OBJECTIVES

The technical objectives of the SABTS program were separated into three phases. Phase I objectives were test site preparation and configuration of the specimen test area, control and monitoring area, and laser device. Phase II objectives were to provide lasing support for the acceptance tests of the SABTS and screening of optimum coatings for the specimens. Phase III objectives were to provide laser support for the optical evaluation of the SABTS specimens.

1. FACILITY SPECIFICATION

Beam characteristics are summarized in table 2. Specifications require a $\le 3.7 \times 3.7$ cm DF beam having at least 36 kW delivered to the SABTS area entrance. The beam was to have less than 0.75 milliradian divergence and a duration of 20 seconds.

In addition, a laboratory area was to be provided having a suitable test environment and the capacity to house portions of the SABTS, including diagnostic test equipment, optical interface table, and mirror cooling equipment. This area was to be at least 8 by 6 meters in size and provided with adequate power, lighting, and cleanliness control.

Table 2. BEAM SPECIFICATIONS

Spectral Emission	3.5 - 4.1 µm
Size	3.7 x 3.7 cm
Power	>36 kW
Divergence	<0.075 milliradian
Duration	≃20 sec

2. TEST MATRIX

The test matrix for Phase II was to be as follows:

No. cf Runs	Approx. Run Time (Lasing)	Approx. Exposure Time/Sample
2	5 sec	5 sec
8	12 sec	6 exposures of 0.25 sec each with 2 sec between exposures
4	30 sec	6 exposures of 3.0 sec each with 2 sec between exposures

Similarly, the matrix for Phase III was to be:

No. of Runs	Approx. Run Time (Lasing)	Approx. Exposure Time/Sample
4Ò	5 sec	5 sec

An additional 7 seconds of lasing time was added to each of the above lasing durations (Phases II and III) for determing power delivered to the SABTS area.

A small-scale effects test was added later to the program scope. These tests were designed to run concurrently (and on a noninterference basis) with Phase III. The objective of the test was to provide laser support to determine the degradation of RF transmission through various materials with air flow over the target during laser irradiation. Other objectives included visual data from material fracture and burn-through rate data at different angles of incidence.

Section III

TEST CONFIGURATION

The SABTS test area was located in the lower vestibule section of the building that houses the BDL device (figure 1). The BDL building location with respect to other CTS facilities is shown in figure 2.

1. BDL DEVICE

The BDL system is a combustion driven, continuous wave chemical laser which produces a multiline infrared laser beam. The BDL may be operated in either a DF/HF or HF/DF mode. In the HF/DF case (used for SABTS), the atomic fluorine required for cold reaction operation was obtained by burning H $_2$ and excess F $_2$ in a combustion chamber to produce equilibrium concentrations of HF, F and small quantities of F $_2$. Helium was added as a diluent to these combustor gases to increase the effective specific heat ratio and thermal capacity of the gases and to lower the effective molecular weight. All three of these effects tend to increase laser efficiency. The combustor gases were then supersonically expanded into a cavity region where they were mixed with D $_2$ to produce vibrationally excited DF, i.e., DF*. The laser spectrum was centered near 3.8 μ m wavelength which is characteristic of the vibration-rotation transitions of DF*.

A photograph of the BDL is shown in figure 3. Figure 4 shows a cross-sectional view with the various reactants in the flow field. The cavity injector consists of six modules, each 4-inches high and 10-inches long. Figure 5 shows the six BDL modules in place and figure 6 is a view of the front of the BDL with one injector nozzle in place. This configuration of the six modules produces an active gain cross section, normal to the flow axis, of 4 by 60 inches. The optical axis of the laser resonator was placed parallel to the 60-inch dimension.

The compustor and nozzles were cooled with deionized water. The combustor and nozzle coolant system are pump-fed due to the high flow rates (36 and 144 gpm, respectively) and low pressure requirements (45 and 150 psia inlet pressure, respectively). The low cavity pressure required for satisfactory laser operation is obtained by a two-stage steam condenser ejector system used as a pump system for the BDL laser flows. The

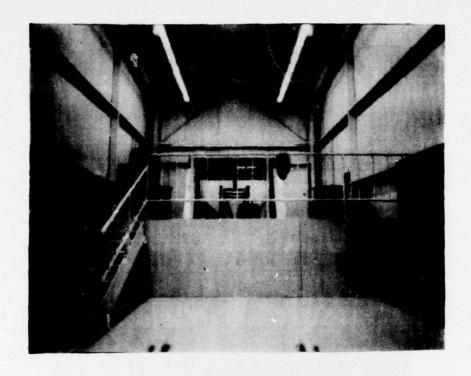


Figure 1. Lower Vestibule Section - BDL Building

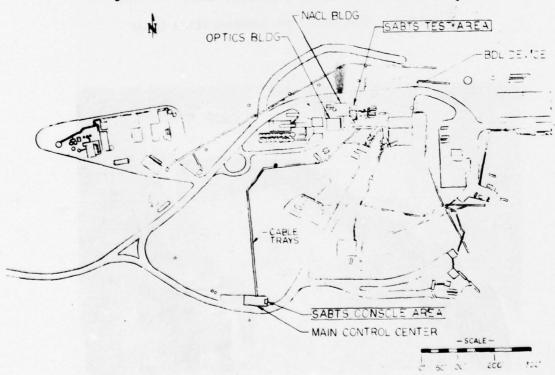


Figure 2. SABTS Overall Area (CTS Site)

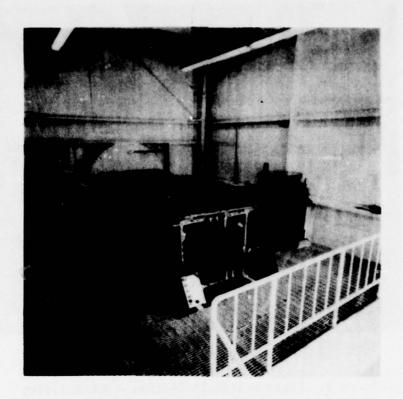


Figure 3. AFWL Baseline Demonstration Laser

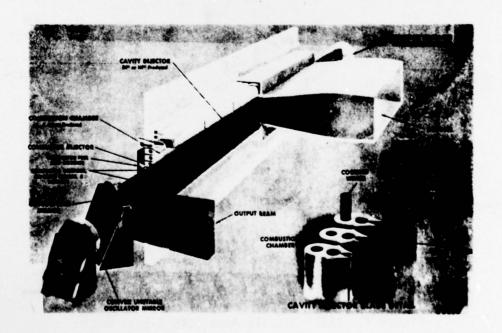


Figure 4. AFWL-BDL Reactant Flow Field

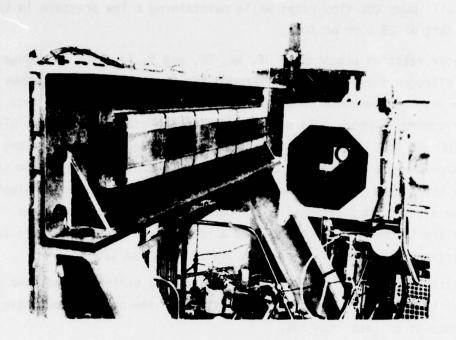


Figure 5. BDL Modules (Six) Installation

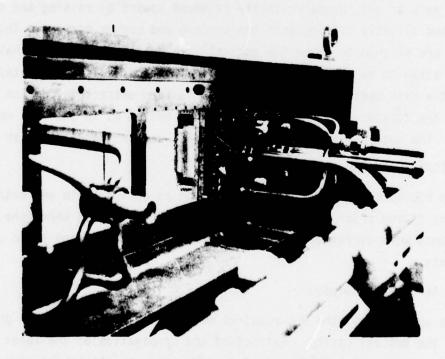


Figure 6. Front View of One BDL Module

system will pump BDL flow rates while maintaining a low pressure in the 6-foot duct of 25 torr or less.

Laser reaction products of HF, He, DF, and D_2 (and the aerodynamic window nitrogen flow) are pumped through the first stage of the steam ejector into the condenser. Discharge of the first stage flows into the ejector condenser where cold water condenses the steam and condensible gases (HF and DF). Noncondensible gases such as He, N_2 and D_2 , along with some vapor carry over from the condenser, are pumped to atmospheric pressure by the second stage of the steam ejector system. Condensed steam from the first stage, along with the condensible laser gases, flows through the barometric discharge into a reservoir. The temperature of the fluid leaving the condenser is approximately 100° to 120° F.

In the HF/PF mode, the BDL device provides a nominal broad band power level of 60 to 70 kW. Temporal fluctuations of the power output have been determined to be less than 10%.

The BDL was operated in a half mode configuration to produce an unobscured beam for this program. To achieve the half mode configuration, the optical axis of the resonator cavity is moved upward by raising the convex mirror and slightly tipping both the concave and convex mirrors. These mirrors are aligned to cause the optical axis associated with the half mode configuration to be parallel to the original optical axis and located within the gain medium. The laser energy is then extracted from the bottom part of the scraper, rather than the top and bottom as in the full mode design. The beam power for these test series was in the 38 to 45 kW level.

2. OPTICAL TRAIN AND COMPONENTS

The BDL outcoupled beam was put through an optics train and beam conditioning system prior to entering the BDL lower vestibule where the SABTS experiments were performed. Figure 7 shows the beam path and basic optical components.

a. BDL Aerodynamic Window

The operation of the BDL requires near vacuum (below 10 torr) pressure in the optical cavity. Extraction and propagation of the laser energy involves a transition step from a few torr to atmospheric pressure.

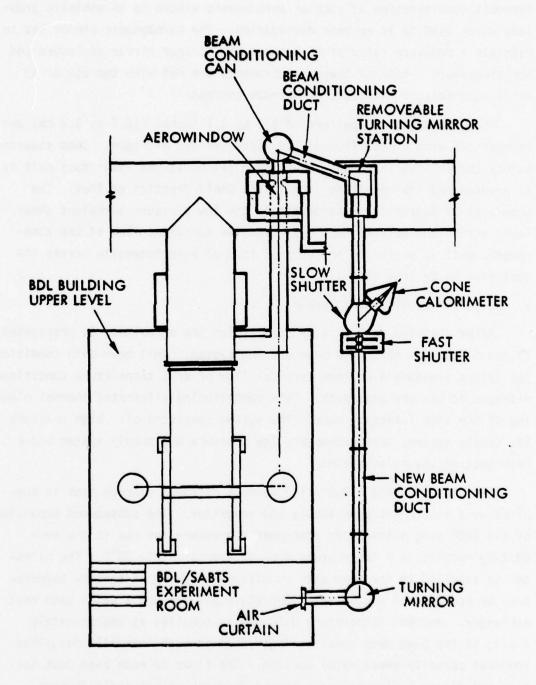


Figure 7. Beam Path and Optics Components Schematic

The principal requirement for the BDL aerodynamic window is to pass the 4.0 by 1.0-inch chemical laser beam from the low pressure laser cavity region into the atmosphere without passing through a solid window. The foremost consideration of such an aerodynamic window is to minimize problems which lead to laser beam degradation. The aerodynamic window has to maintain a pressure ratio of 76 between the scraper mirror enclosure and the atmosphere. Both of these requirements are met with the use of an axial supersonic flow nozzle aerowindow concept.

The window has an aperture of 5.0 by 1.5 inches (12.7 by 3.8 cm) and is operated with a mass flow of 3.0 lb/sec of dry nitrogen. Beam steering across the oblique shock and shear layer set up at the laser duct exit is $12 \mu radian$ and its resulting jitter is a small fraction of that. The beam quality degradation introduced by the low pressure turbulent shear layer across the optical duct exit plus the turbulent flow at the atmospheric exit is estimated in terms of loss of beam intensity across the duct exit to be less than 1%.

b. Beam Path Conditioning System

After the high energy laser beam exited the aerowindow it propagated to the SABTS room through a beam ducting system. This beam path conditioning system provided a uniform vertical flow of dry, temperature conditioned, nitrogen across the beam path. This conditioning eliminated thermal blooming of the high intensity beam. The system consisted of: high pressure ${\rm GN}_2$ supply system; heat exchanger; low pressure ${\rm GN}_2$ supply system and a beam duct/enclosure subsystem.

The high pressure (2200 psig) gaseous nitrogen storage tank is supplied by a liquid nitrogen supply and vaporizer. The subsequent expansion of the 2200 psig nitrogen to atmospheric pressure for use in the beam ducting results in a temperature drop of approximately 50° F. The nitrogen is supplied to the beam path conditioning system at ambient temperature by passing the subambient temperature gas through a water bath heat exchanger. Ambient temperature nitrogen is supplied at approximately 2 psig to the beam path conditioning system through thermally insulated low heat capacity sheet metal ducting. The flows to each beam duct section and mirror enclosure are adjusted by means of butterfly dampers.

This passive thermal control system has resulted in a nitrogen temperature difference in the mirror enclosures and the adjacent beam ducts of $1^{\rm O}F$ or less during day or evening operations. Interferometer test results obtained on a test duct section and mirror enclosure indicated that beam quality would be seriously degraded if the temperature between the N₂ in a mirror enclosure and in the adjacent beam duct section exceeded 1.5 $^{\rm O}F$ for the turbulence conditions existing at the enclosure/beam duct interface.

A cross section drawing indicating the features of construction of the beam duct is shown in figure 8. The nitrogen flow is down in a vertical direction across the beam. The region through which the beam passes is maintained at approximately 0.5 inch of $\rm H_20$ gauge pressure by a selected filter material backed up by hardware cloth. The internal surface of the flow distribution plenum is covered with a 0.5-inch thickness of Minicel, closed cell foam insulation. The beam path duct system is shown in figure 9.

A similar N_2 flow distribution system was used for the mirror enclosures. The flow is directed vertically downwards across the mirrors. Internal baffles and filter cloth are used in the enclosures to aid in directing the flow across the beam path.

The beam duct pressure of 0.5-inch $\rm H_2O$ gauge is obtained using an $\rm N_2$ curtain at the downstream end of the system, just before the SABTS. The centrifugal force generated by injecting a rectangular jet of $\rm N_2$ along a curved surface at an approximate velocity of 160 fps eliminates the axial flow from the beam duct. The configuration of the $\rm N_2$ curtain at the beam duct termination is shown in figure 10.

c. Beam Shutter System

The shutter system provides the capability to turn the beam off and on during the experiment to within a few milliseconds of preselected times. The enclosure for the shutter system is shown in figure 11.

The shutter must be fast acting to rapidly cut off the beam in case of sudden onset of damage, to allow minimum dead time between target changes, and further to better define damage onset levels where a rectangular shaped pulse in time is desired. For fast closing shutters, light

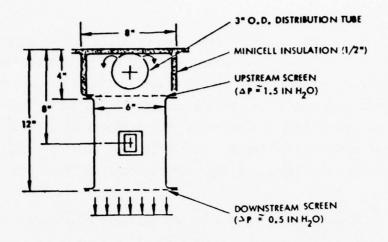


Figure 8. Cross Section of Typical Beam Duct

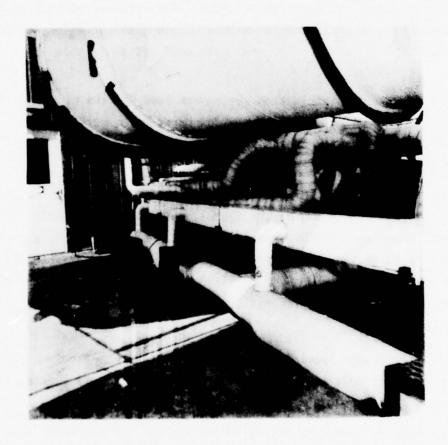


Figure 9. Beam Path Duct System

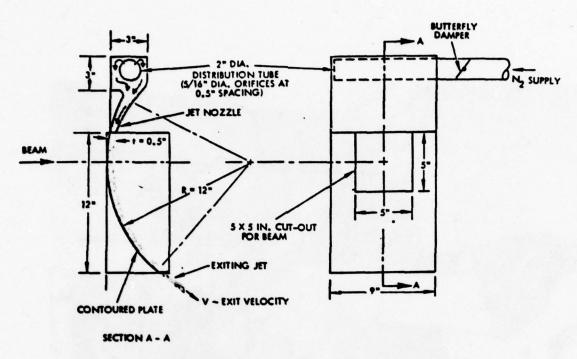


Figure 10. Configuration of N₂ Curtain at Beam Duct Termination

weight is desirable. However, for long periods or continuous duty, a heavier water cooled shutter is required. To satisfy both requirements, beam control is established through the use of two shutter systems designated the slow and fast shutters, operated in conjunction with a sequencer.

The slow shutter shown in figure 12 is a pneumatically actuated, water-cooled metal mirror which can close and obscure the beam in less than 200 milliseconds. In the closed position the BDL beam is reflected into a water-cooled whole beam calorimeter, which is used to determine the primary beam power during the test runs. Since the slow shutter is designed to withstand high flux levels for extended periods of time, it is closed during a test sequence to permit resetting of the fast shutter.

The fast shutter is used to provide beam pulse intervals with fast rise and fall times. This shutter mechanism, shown in figure 13, utilizes uncooled highly reflective metal mirrors which can be rapidly translated along separate but parallel tracks. To set the fast shutter, the mirror blades are preumatically cocked against a spring load and mechanically

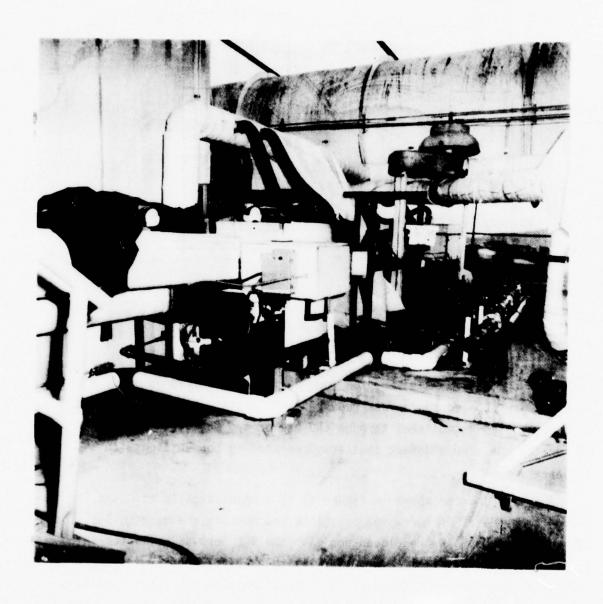


Figure 11. Shutter System Enclosure

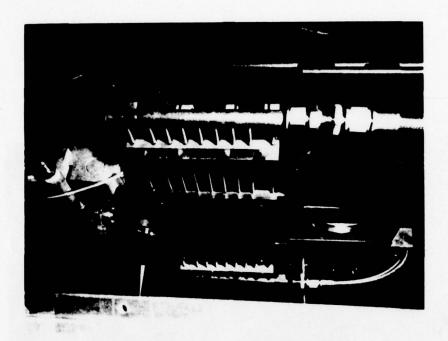


Figure 12. Slow Shutter

latched. In the cocked position, the opening blade obscures the beam. On command it is unlatched and after a 40 to 60 millisecond acceleration period is pushed out of the beam path in 5 to 10 milliseconds. After the required exposure interval, the closing blade is unlatched and the beam is completely obscured in about 70 milliseconds. As soon as the beam is completely obscured, the water-cooled slow shutter is closed to protect the fast shutter mirrors. Once the next target is in position the fast-slow shutter sequence is repeated.

d. Power Measurement

The absolute magnitude of the beam power for a given run is generally measured during the first and last three seconds of the run by the primary calorimeter sampling the reflected radiation from the slow shutter. A cross section of the water-cooled cone calorimeter is shown in figure 14. A photograph of the cone calorimeter as it sets in front of the slow shutter is shown in figure 15. The shallow cone angle was employed to spread the high power fluxes of the outcoupled beam over a large area and reduce the thermal loading per unit area. The power absorbed by the calorimeter is determined from measurements of the coolant water flow-rate and the

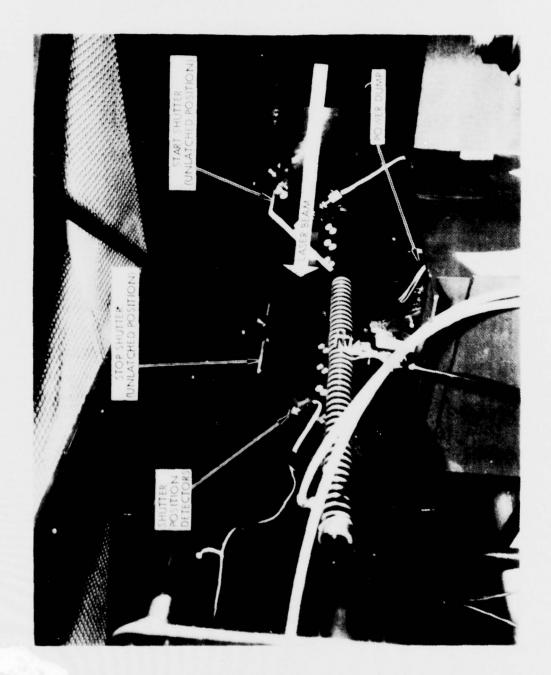
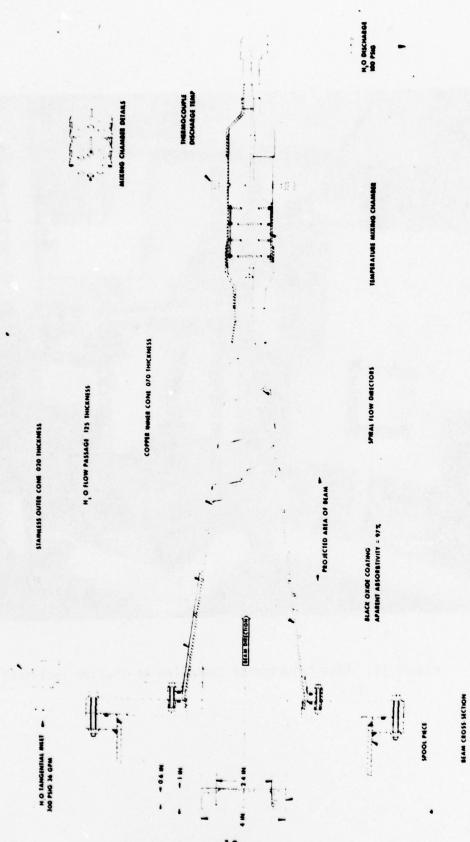


Figure 13. Fast Shutter



INERMOCOUPLE INSET TEMP

Figure 14. BDL Cone Calorimeter Schematic

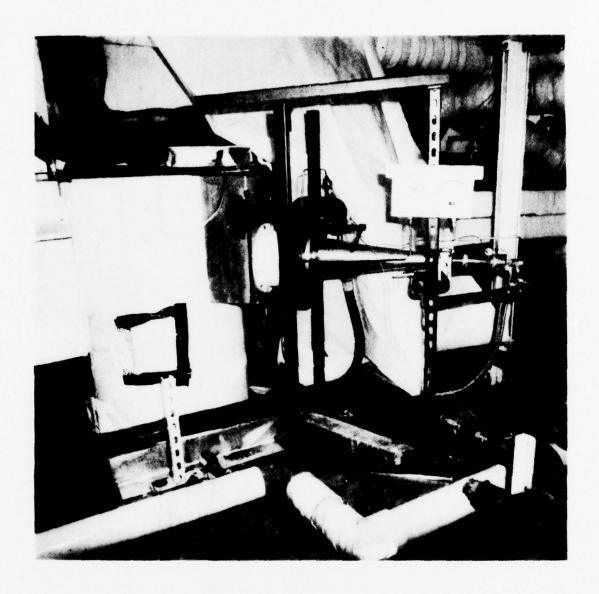


Figure 15. Cone Calorimeter Installed at Shutter Enclosure

temperature difference (ΔT) between the entering and exiting water. The coolant water flow-rate is measured using a calibrated turbine-type flow-meter. Typical ΔT s measured during power tests ranged from 7 to $8^{\circ}F$ with a coolant water flow rate of about 36 gpm.

The absolute value of power at the start of the run is used to calibrate the simultaneous signal obtained from an IR P(t) detector, which samples the scattered radiation from an upstream turning mirror. A typical P(t) relative power trace is shown in figure 16. Variations of power output as a function of time during a typical run are less than 5%.

3. CONTROL AND INSTRUMENTATION

Control for SABTS was provided by an interconnection of the FACC programmer-controller in the BDL annex to the remote control panel in the Main Control Center. This connection allowed for operation of required manual functions and the synchronization of the delivery of the BDL beam to SABTS. The PDP-8 was used as a programmer to automatically sequence the operation of the SABTS with the opening and closing of the slow and

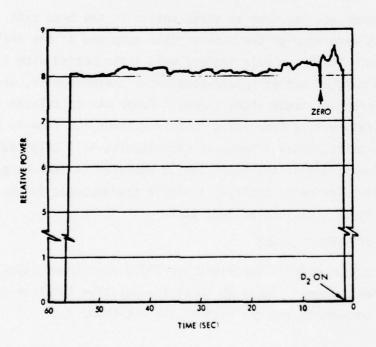


Figure 16. Relative Power vs. Time as Seen by P(t) Instrument

fast shutters. In addition, manual controls were provided adjacent to the remote control panel for override of programmed carousel positions and/or burn times. Visual indicators and/or manual controls were provided in this same area for the status of the beam control shutters, the carousel index status, and the various permit, override, and abort signals.

All signals indicated as instrumentation in figure 17 were recorded on an oscillograph to provide verification of proper function and time correlation.

Instrumentation for parameters concerning the operation of the BDL device such as pressures, temperatures, fluid flows, voltages and reactant valve operations was routed through the BDL Navy ARPA Chemical Laser and effect test shelter patch boards to the Main Control Center instrumentation patch system where it was routed to the various displays and recording systems as required per the Test Plan (figure 18). The AGA IR camera signals were patched to a high speed analog recorder for subsequent data analysis and to an oscilloscope display for real-time monitoring. This system also generated a P(t) signal for beam on correlation to TRW and SABTS instrumentation.

Beam power was measured at three points in the beam path. Cone calorimeters were used at the slow shutter dump and at the SABTS input clipper dump. These two calorimeters were instrumented with a water flow-meter and a matched set of copper-constantan thermocouples, wired to produce a differential temperature signal. Power was calculated from the water temperature rise from inlet to outlet times the flow in gpm. During some of the tests, a Naval Research Laboratories Ball Calorimeter was installed downstream of the SABTS sample position to measure power at that point. This calorimeter employed a single thermocouple to measure the temperature rise of a calibrated heat sink.

4. SABTS EXPERIMENT LAYOUT

This section briefly describes the SABTS experiment layout inside of the BDL effects room. Figure 19 shows the relative location of the primary experiment components and the path of the HEL beam.

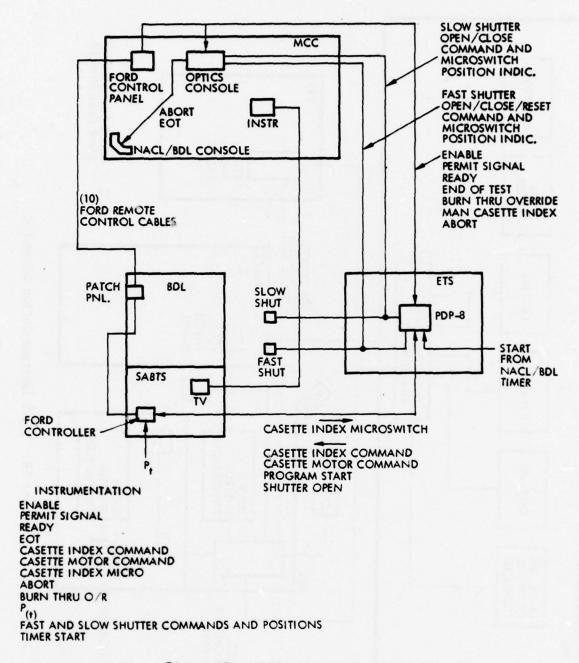


Figure 17. SABTS Control Schematic

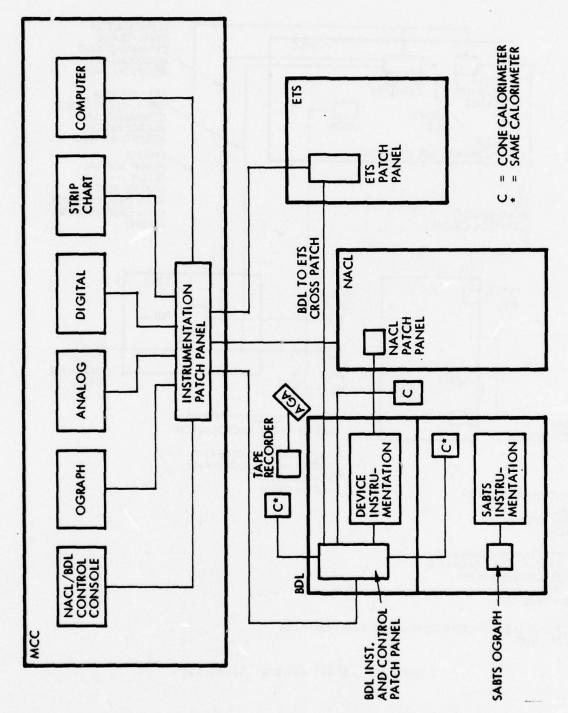


Figure 18. SABTS Instrumentation Schematic

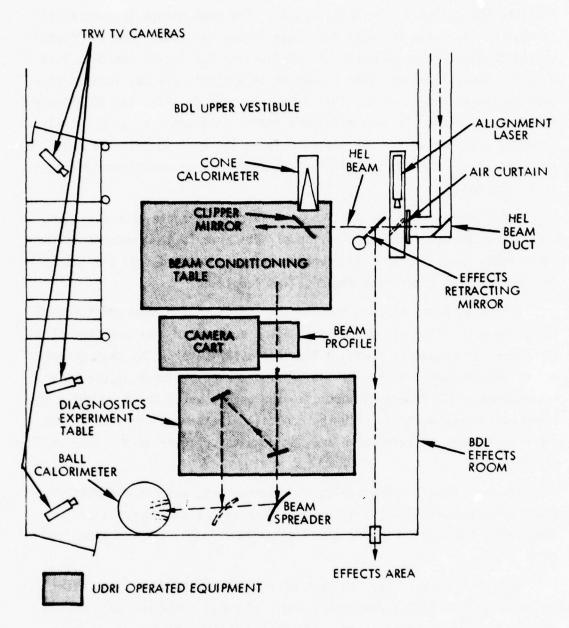


Figure 19. SABTS Experiment Layout

The HEL beam entered the BDL lower vestibule in the northwest corner from the BDL optics train (Sect. III-2). The beam passed through an air curtain as it exited the beam duct just inside the room. The air curtain served to maintain an overpressure of 0.5-inch H₂0 inside the beam duct. A helium neon alignment laser placed on an optical rail was located adjacent to the beam duct exit. This laser was used to align the SABTS experiment optics to the HEL HeNe alignment beam. This was done by precisely indexing a mirror in the HEL optics path on the rail so that the HeNe beam was always coincident with the HEL beam path as described by a separate HEL HeNe beam.

Prior to entering the SABTS beam conditioning table, a copper heat sink mirror directed the beam to the effects area located outside of the SABTS room. The effects retractable mirror was removed from the beam path once the effects experiment sequence was completed.

The total power allowed through the optics in the beam conditioning table was controlled and measured by using a circular aperture beam clipper mirror in conjunction with a TRW cone calorimeter. The beam clipper mirror was located just inside the beam conditioning table as the beam entered the SABTS experiment optics. The beam power clipped by the apertured mirror was measured with the cone calorimeter and compared to the whole beam power measured with another cone calorimeter at the slow shutter position.

The beam conditioning table, the camera cart, and the diagnostics table were operated by UDRI personnel. The operational details of these components and details of the SABTS experiment itself are not described here.

The basic path of the HEL beam through the SABTS experiment stations is shown in the SABTS experiment layout figure 19. The HEL beam passed through the optics of the beam conditioning table into the diagnostics table where the primary experiment was performed. The beam profile was measured between the tables. The remaining HEL beam after it left the diagnostics table was dumped into an NRL ball calorimeter.

There were two alternate paths through the diagnostic table optics depending on whether a transmission or a reflection sample was being

irradiated. This determined the location of the beam spreader mirror positioned outside the diagnostics table. This mirror also served to spread the concentrated HEL beam to prevent damage to the ball calorimeter which might have resulted from the high beam intensities.

Also shown in the SABTS experiment layout are three television cameras. These cameras were used to visually monitor the experiment components during a test to determine the necessity of an emergency shutdown.

5. EFFECTS STATION (ADD-ON EXPERIMENT)

The beam for the effects experiment was obtained as it left the beam duct in the SABTS test room and was directed outside the building through a 6- by 6-inch hole in the wall, shown schematically in figure 19. A retractable mirror mount was fabricated for the purpose of pulling the mirror (8- by 9-inch copper furnished by the Navy) from the beam path at the conclusion of the effects experiment. The mirror actuator enabled the experimenter to pull the mirror up from the beam or down from the beam. Proximity switches at either end of the stroke indicated the position of the mirror at the test console.

The basic effects area hardware included a 3- by 1-inch wind tunnel supplied by an 18 bottle farm. The wind tunnel was supplied by the Air Force Weapons Laboratory. The pressure to the dome of the regulator and air supply for the wind tunnel solenoid valve were supplied from the upstream air line to the wind tunnel.

A 24- by 24-foot canvas canopy was provided for the test area to protect equipment and instrumentation from weather. Transite sheets were situated behind turning mirrors and the target position as a safety measure. In addition, two video cameras were provided to monitor the effects experiment from the control center; one for an overall view and one to determine recording equipment readiness.

a. Instrumentation and Controls

The experiment instrumentation and recording equipment were supplied by the AFWL. The local experiment oscillograph, cameras, and the missile controller were turned on remotely from the control center during the countdown sequence. Video coverage included an overall view of the experiment and a closeup of the missile controller status gauges.

The complete list of Control and Instrumentation signals is given in table 3. The PDP8 controller provided two commands: one to retract the effects director mirror in the SABTS building and the other to turn on the wind tunnel at 3 seconds prior to acquiring the beam. An interlock switch on the retractable mirror confirms mirror retraction to the computer. The experiment/test site electrical interface schematic is shown in figure 20.

Table 3. LIST OF EFFECTS EXPERIMENT TEST COMMAND AND INSTRUMENTATION SIGNALS

<u>Controls Signals</u>	
Manual:	1. Instrumentation ON
	2. Instrumentation OFF
	3. Effects Timer Package START
	4. Effects Timer Package OFF
	Effects Director Mirror Retract Signal (PDP8 Override)
	6. Effects Director Mirror Manual Retract
PDP8:	1. Mirror Retract Signal
	2. Wind Tunnel Turn on (110 VAC)
	Mirror Interlock Feedback (in/out)
Instrumentation	
Video coverage:	1. 1 overall with monitor for test conductor
	1 for recording equipment observation (optics console)
Monitor signals:	 Effects Director Mirror position (optics console)
	Fast Shutter/slow shutter, open/close (already on optics console)
Record:	P(t) (same as SABTS)

MAIN CONTROL CENTER INSTRUMENTATION-CONTROLS 4 EA. O MIRROR RETRACT SWITCH OVERIDE/MIRROR POSITION OTV CAMERAS BDL PATCH **ETS** EFFECTS RETRACTABLE DIRACTOR MIRROR POPE P (t) SABTS NACL EFFECTS INSTRUMENTATION WIND TUNNEL

Figure 20. Effects Instrumentation/Controls Layout

Section IV

TEST RESULTS

A complete tabulation of all test results for the program has been included in the appendix. Discussed below is a description and summary of this data.

1. PERFORMANCE DATA

Performance data was generated for each of the 43 tests in the SABTS series. This data (TRW generated, and published in the SABTS — Weekly Data Summary) was presented in three parts: (a) a plot of estimated power versus run time, (b) planned time lines and quick look data sheet, and (c) photos of the beam intensity profile.

The plots of estimated power versus run time (figure 21) show the power measured at the slow shutter (when it is closed) and at the SABTS clipper. In addition, total device power was calculated from the power at the slow shutter calorimeter and a factor developed on the first two tests. The Planned Time Lines and Quick Look Data Sheet presents the planned and actual sequence of operations for a given test. Also indicated are information on the SABTS specimen(s) and diagnostic sequencing. The photos of the beam intensity profile are those obtained from an IR Camera (AGA) viewing the second turning flat mirror (just upstream of the slow shutter). Typical performance data sheets are shown in figures 21 through 23.

SUMMARY

A total of 43 lasing tests (VL1-245 through 287) were conducted at the BDL facility during the SABTS test program. Total lasing duration was approximately 1058 seconds with a total testing time of 922 seconds. Actual time that the laser beam was incident on SABTS targets was a total of 286 seconds (135 exposures including 14 plexiglass samples). Table 4 lists all the tests in the SABTS series and provides pertinent information as to duration, number of samples, purpose and comments. The test duration is defined as the time from combustor oxidizer (F_2) on to cavity fuel D_2 off, whereas lasing duration is from D_2 on to D_2 off. In most cases, the purpose of the test is indicated by the number and the exposure duration

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1- 270 **ESTIMATED POWER VS. TIME** 30 RUN TIME - SEC. C 20 REMARKS: 0 40 8 2 POWER - KW

PREPARED BY: Figure 21. Estimated Power vs. Run Time

			PLANNE	D TIME LI	OUCK LOOK TEST DATA	PLANNED TIME LINES AND QUICK LOOK DATA SHEET	DOK DAI	A SHEET		
TUN NO.	RUN NO. W. 1- 270	O PLAN	W CABTE		DATE 2-10	2-10-77	TIME	1935		
D2 FIRE VALVE OPEN (SEC)	SEC) 10.		CLOSED (SEC) 5	51.9	LASING DURATION (SEC)	41.5	TOTAL COMPLETED TEST POSITIONS	AMETED 7	55	PLANNED 59
PLAN	PLANNED TES	ST NO.0E.	ST NO. OFTVOAS TIME LINES	LINES		AS OF	DAT	DATE 2-10-77 REVISION	REVISI	ON DRIG
EXPERIMENTER	LTER		PLANNED LINEAR		1.7	CONFIGURATION	MATION			
D. ,	D. MULLEN	N	PLANNED PEAK	TAK 10K	IOKW/CM*	2	TRANSMISSIVE			
			PLANNED				DV	ACTUAL		
TEST POSITION	SPECIMEN NO.	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	E TIME FROM	TIME	EST, PWR, AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-	MEXI		3.0	4.5	14.00	13.0		77.5		
-	*	3/1	4.0	1.10	21.50	20.7		8.95		+
-		DOF	4.0	1.10	2660					
5		DOF	4.0	1.10	31.70					
•	•	HOUSE	4.0	01.1	36.80					
		PLEXI	-		47.00					
					11.74	20.9		56.9		
	ITEM		START (SEC)		STOP (SEC)		ITEM		START (SEC)) STOP (SEC)
2	TV CAMERA NO	1 .04	NO	-		O-GRAPH		-	MON.	MA
	2	76.2				SANGAMO No.	O No. 1		6.0	54.0
	2	76. 3	3			SANGAMO No.	O No. 2		N/A	
	i	· ig	•			SABTS SEQ.	Ġ		21.5	47.
UN/W	1	MNEL	11.0	1	18.00	CALORIM	CALORIMETER (SABTS)		5//2	47.
×5	-	110110				CALORIM	CALORIMETER (SLOW SHUTTER)		10.0	14.0
HI	٦,	DIANOID	10.0	-	52.6	:			15.0	21.5
DO	PRECTO	MIPPIN	EWD OF						111	22

Figure 22. Planned Time Lines and Quick Look Data Sheet

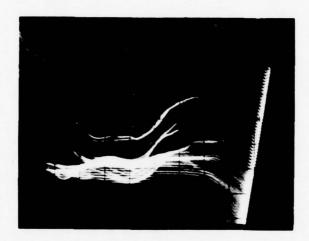
LASER PERFORMANCE ANALYSIS, RUN VL1-270

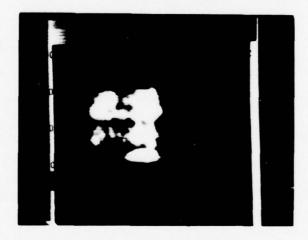
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20





LEE BERGERSON

BEAM DIAGNOSTICS ENGINEER

Figure 23. Beam Intensity Profile

Table 4. RUN LISTING

Comments		F ₂ scan samples were plexiglass and Transite	Slow shutter did not open. Samples were plexiglass	Burn wire termination. SABTS test at 1st position Alignment prism exposed to beam. Manual S/D, low power		F2 scan power remains low on plexiglass sample	Mirrors realigned. Pretest power backup F ₂ scan completed.	SABIS spider burn through plex samples	Plex sample				•				Last sample burned through < 1 sec Slow shutter did not open				End of Phase II
Purpose	Checkout	Checkout/Alignment	Checkout/Alignment	Checkout/Alignment	Checkout/Alignment	Checkout/Alignment	Checkout/Alignment	1st SABTS Checkout	SABTS Checkout	1st SABTS Specimen	6/.25 ^S exposures	6/4 ⁵ exposures	6/.25 ^{\$} exposures	6/4 ⁵ exposures	6/.25 ^S exposures	5/.25 + 1/.05 Plex	6/4 ^s exposures	6/.255 + 1/.115 Plex	5/.255 + 1/.115 Plex	5/45 + 1/.115 Plex	5/4 ⁵ + 1/.11 ⁵ Plex
Samples Actual	0	2	•		0	-	-	-	-	9	9	9	9	9	9	9	9	•	9	9	9
Samples Planned	0	2	9	•	-	-	-	9	-	9	9	9	9	9	9	9	•	9	9	9	9
Lasing Duration Actual (sec)	8.7	35.8	16.9	16.9	4.1	27.2	17.4	14.4	7.2	13.9	13.7	36.9	13.8	36.4	13.8	13.8	36.3	13.9	13.8	32.3	32.1
Lasing Duration Planned (sec)	8.7	35.8	16.9	16.9	25.0	27.2	27.4	. 18.0	7.2	13.9	13.7	36.9	13.8	36.4	13.8	13.8	36.3	13.9	13.8	32.3	32.1
Test Duration (sec)	12.7	45.8	27.3	27.3	14.5	37.6	37.8	24.8	17.6	24.3	24.1	46.8	24.2	8.9	24.2	24.2	46.7	24.3	24.2	42.7	42.5
Date	1-1-17	1-11-17	1-13-77	1-14-77	1-18-77	1-18-77	1-19-77	1-21-77	1-21-77	1-22-11	1-24-77	1-24-17	1-56-77	1-56-77	1-56-77	11-27-17	1-27-17	1-28-17	1-28-17	1-28-77	1-28-17
Test Number VL1-	41 245	546	247	911 248	546	250	152	252	253	254	552	556	152	258	529	560	261	797	263	564	592

Table 4. RUN LISTING (Continued)

Coments			∿18 Plex exposure at effects station	3.0 exposure to effects Test aborted — UDRI calorimeter fire	2nd sample burn through 3 sec effects (Plex)	1st sample burn through	3 sec effects exposure	3 sec effects exposure 4 samples burn through — Test term after 5th sample	Reflective samples 3 sec effects exposure Carousel failed to index	3 sec effects exposure Effects miro dropout — no SABIS exposures	1 sec effects exposure (Plex) Lost power during 3rd SABTS sample $ {\rm F}_2$ depletion	2/3 sec effects exposure No SABTS exposure — fast shutter not reset	No effects attempted. 2.2 ⁵ exposure to SABTS	effects exposure	2/3 ⁵ effects exposure	2/3 ⁵ effects exposure	1/3 ⁵ 1/2 ⁵ effects exposure	1/4 ⁵ 1/5 ⁵ effects exposure	1/6 ⁵ 1/3 ⁵ effects exposure F, premature shutdown	2/3's effects exposure	2/3 ⁵ effects exposure	3 SABIS samples override after∿1 ^S samples
Purpose	Checkout and Alignment	Checkout and Alignment	5/45 + 1/.115 Plex	5/4 ⁵ + 1/.11 Plex	5/4 ⁵ + 1/.11 ⁵ Plex	5/45 + 1/.115 Plex	5/4 ⁵ + 1/.11 ⁵ Plex	5/4 ⁵ + 1/.11 ⁵ Plex	4/4 ⁵ + 1/.10 ⁵ Plex	4/4 ⁵ + 1/.10 ⁵ Plex	4/4 ⁵ + 1/.10 ⁵ Plex	1/4 ⁵	1/48	1/48	1/45	1/48	1/45 + 1/.15 Plex	1/45 + 1/.15 Plex	4/45 + 1/.15 Plex	5/45 + 1/.15 Plex	1/45 + 1/.15 Plex	5/4 ⁵ + 1/.1 ⁵ Plex
Samples Actual	2	2	9		9	9	9	9	-	0	е	•	-	-	-	-	2	2	2	9	2	9
Samples Planned	2	2	9	9	9	9	9	9	s	5	5	-	-	-	-	-	2	2	S	9	2	9
Tasing Duration Actual (sec)	12.8	12.8	45.0	2.62	41.5	45.0	45.0	30.3	30.3	16.9	24.6	22.6	20.5	23.1	22.6	22.6	22.6	26.7	40.9	44.1	24.6	34.8
Lasing Duration Planned (sec)	12.8	12.8	45.0	4 3	41.5	45.0	45.0	42.0	36.0	38.0	38.0	22.6	23.0	23.1	52.6	22.6	52.6	26.7	42	45	24.6	45
Test Duration (sec)	23.2	23.2	52.4	39.6	61.9	52.4	52.4	40.7	40.7	26.8	49.3	33.0	30.9	33.0	33.0	32.5	32.5	36.6	49	54.5	34.5	44.7
Date	2-8-17	2-8-11	2-9-11	2-9-11	2-10-77	2-10-77	2-11-77	2-15-77	2-16-77	11-11-2	2-11-71	2-22-11	2-23-17	2-24-77	2-24-77	2-25-77	2-26-77	2-26-77	2-27-17	2-28-77	2-28-11	3-1-77
Test Number VL1-	1111 266	267	568	569	270	172	272	273	274	275	576	112	278	279	280	281	282	283	284	582	586	287

of the sample; i.e., $6/.25^{\rm S}+1/.11^{\rm S}$ plex means six SABTS samples each exposed to the HEL beam for 0.25 seconds plus a plexiglass sample exposure for 0.11 seconds. During the later portion of testing (VL1-266 and subsequent — Phase III) the HEL beam was also directed at various effects specimens (add-on experiment) in addition to the SABTS exposures. Some device/optics related problems were experienced during the initial phase of testing (VL1-245 through 250); i.e., cavity misalignment, failure to retract alignment periscope, and the slow shutter not opening. Test VL1-251, which featured an F_2 scan to characterize the device, was the last test after which no major adjustments were made to the device or the optical train. Following test 251 only minor adjustments were made in reactant flow rates and optical alignment to maintain device power (as measured at the slow shutter calorimeter) above the 36 kW allowed minimum.

Section V

DISCUSSION OF RESULTS

1. TECHNICAL PERFORMANCE SUMMARY

a. Power Performance

The off-axis mode of cavity alignment (Section III) produces an exiting beam with protruding edges ("fangs"). These edges are removed at the fang clipper producing a square shaped beam. For the first two tests (VL1-245, 246) a cone calorimeter was located at the fang clipper as well as at the slow shutter. Thus, power was measured at the slow shutter and at the fang clipper and total power was calculated from the sum of the two. On subsequent tests the cone calorimeter at the fang clipper was moved to the clipper in the SABTS test area (the fangs were still being clipped but this power was now being dumped into a noninstrumented graphite block).

Figure 24 is a plot of power versus test number showing both the total device power (estimated from the third test to the end of the series) and the SABTS "delivered" power (at the slow shutter calorimeter). Power at the fang clipper calorimeter is also shown for the first two tests. The first seven tests in the program were essentially checkout and reactant (F_2) scans to determine device characteristics. Some difficulties were experienced during these tests related to cavity misalignment and human error. However, once exposures to SABTS sample began (with test VLI-252), delivered power did not drop below the minimum program requirement of 36 kW. One power drop caused by premature depletion of F_2 did occur during run VLI-276.

Delivered power (as measured at the slow shutter when the slow shutter is closed) was determined just before and just following SABTS exposure(s) and the values plotted in figure 24 are those averaged for a particular test. Average delivered power was 42.1 kW (σ = 1.36 kW) for tests VL1-252 through -287 with a maximum of 44.1 and a minimum of 37.6 kW. It should be noted that this minimum value of 37.6 kW is > 3 σ below the average value. In fact, on the test (-273) where the lowest value occurred, flow rates were inadvertently set such that a low available F rate ($\dot{N}_{\rm F}$) and a low F₂

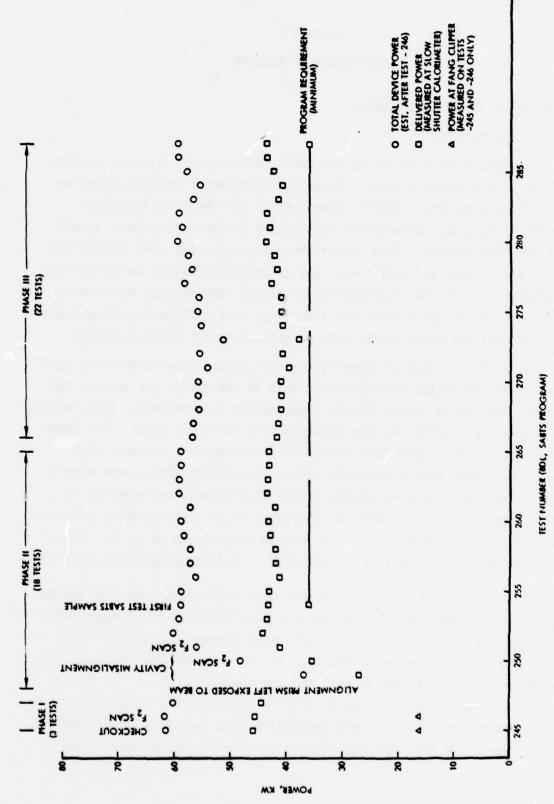


Figure 24. Power vs. Test Number

mass rate coincided to cause the low power. If the value of 37.6 kW is statistically eliminated, average power would be 42.2 with a standard devition (σ) of 1.14, indicating fairly consistent device power delivery.

b. Optical Performance

The beam size was determined several ways. First, a TRW EMBLAZONU code computer calculation was used to predict the beam profile during the designing stages. A SABTS clipper having a 3.5 cm diameter hole normal to the beam was considered in these calculations. The prediction of beam power and irradiance passing through the hole, and that being reflected by the clipper are shown in table 5. The calculations predicted 24% of the beam would be clipped and 76% would pass through the SABTS clipper.

Table 5. DATA FROM CALCULATIONS BASED ON EMBLAZONU COMPUTER PLOTS

	SABTS Clipper
Total Power to Clipper (kW) (assumed)	50.0
Power through Clipper Hole (kW)	38.0
Power Dumped by Clipper (kW)	12.0
Maximum Irradiance at Clipper (kW/cm ²)	12.5
Average Irradiance through Clipper Hole (kW/cm ²)	3.9

The major method of determining beam size measured through many continued runs was obtained by snapshot imaging of the scattered HEL radiation from the second turning flat mirror at different times into the run using an AGR IR camera. Representative contour and three-dimensional plots are shown in figures 25 and 26. In particular figure 25 shows intensity contours of the beam. Numbers seen in the figure on each countour line indicate percentages of the maximum intensity. Using a 20% cutoff of the contours, beam heights for various runs are presented in figure 27. Allowing for mirror tilt, all widths were equal to or less than the heights, permitting more than the calculated fraction of the beam to bass through the 3.5 cm diameter SABTS clipper.

BDL/SABTS TESTING - AGA

TIME = 13.0 SEC

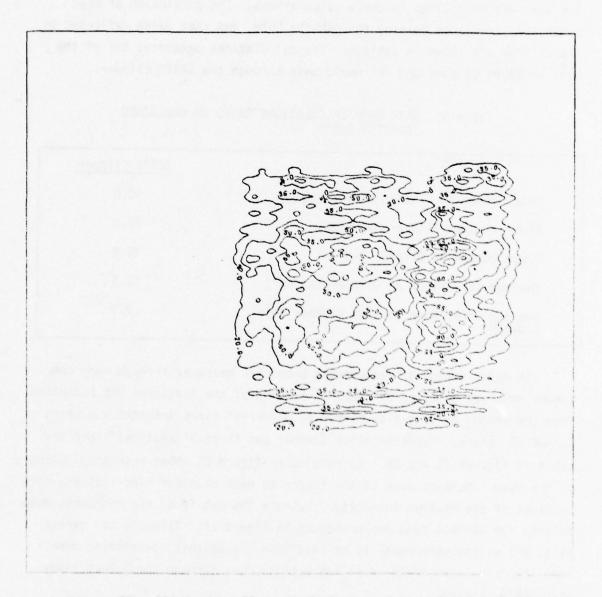


Figure 25. AGA Contour Plot of HEL Beam on Second Turning Mirror

BDL/SABTS TESTING - AGA TIME - 13.0 SEC TIME - 13.0 SEC

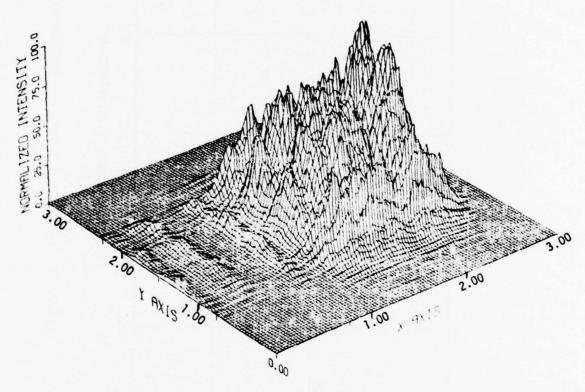


Figure 26. AGA 3-D Plot of HEL Beam Profile on Second Turning Mirror

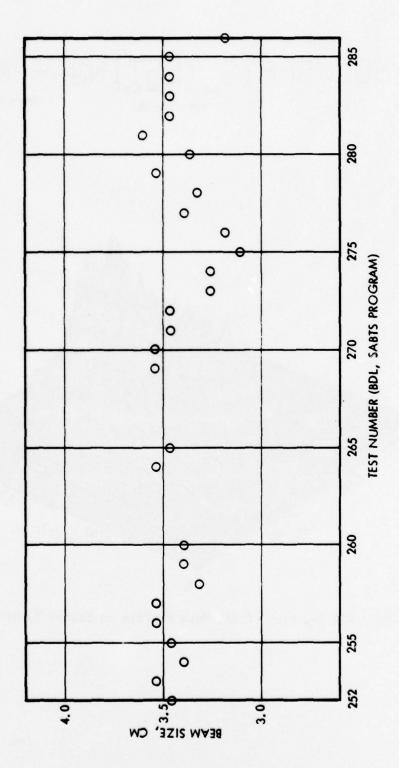


Figure 27. Beam Size (Height) vs. Test Number

A second measurement of beam size was made by measuring the amount of power reflected from the SABTS clipper into the BDL cone calorimeter and ratioing this to the total incident power on the clipper. These ratios for the various runs are presented in figure 28. They ranged in value from 0.13 to 0.26. The average ratio for the vairous points is 0.184. This is slightly better than the 0.24 fraction predicted by the EMBLAZONU calculations.

The third method of checking the beam size was made with an etching burned into a plexiglass sample by the HEL beam at the entrance to the SABTS beam conditioning cart. Measurements on the size of the etching, shown in figure 29, indicate the beam size to be 3.5 cm.

In addition to beam size, beam alignment was repeatedly monitored. Once the HeNe laser beam was aligned with the HEL beam via a plexiglass burn etching, subsequent checks of the BDL-SABTS optical train were made daily using the HeNe alignment beam. Additional checks were made whenever indicated. Further monitoring of the beam path was made from run to run by checking for any possible movement of the AGA HEL image. Additionally, continuous monitoring of the beam alignment was made by observing the clipped beam power from the SABTS clipper. Had misalignment occurred, it would have resulted in a sizeable increase in the clipped beam power. In general, the beam remained steady and little, if any, trimming of the optical train was required.

TEST OPERATIONS SUMMARY

Figures 30 and 31 summarize the SABTS operations and provide a quick comparison of program objectives with test accomplishments. In particular, figure 30 compares the estimated number of samples planned for testing with the number of samples that were actually irradiated. Test objectives for Phases II and III were 74 and 40 samples respectively for a total program objective of 114 specimens. Altogether, a total of 148 separate test opportunities were provided to SABTS. These test opportunities are defined as those planned specimen tests for which the HEL beam was fully available to the test system. From these opportunities, a total of 135 samples were actually tested by the SABTS. Differences between sample test opportunities

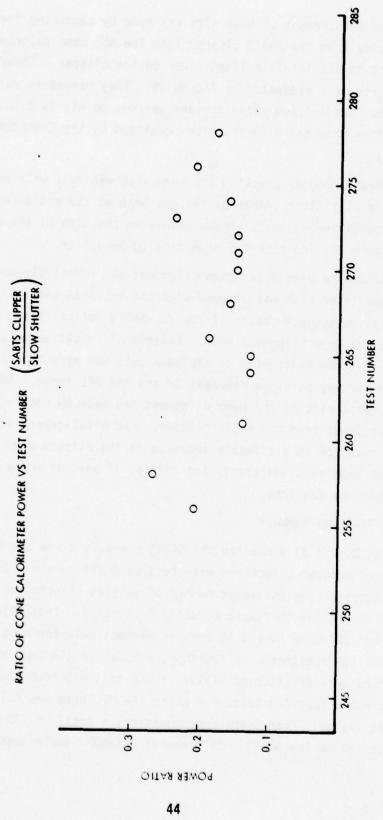


Figure 28. Power Ratio vs. Test Number

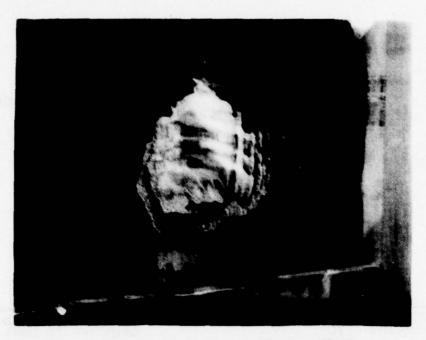
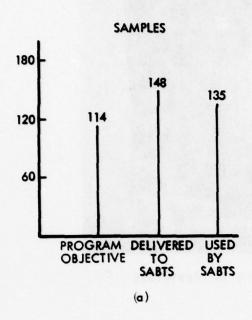


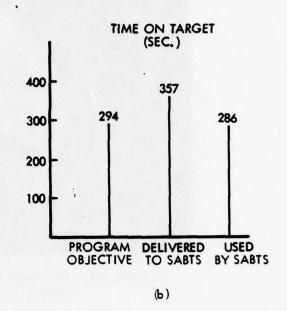
Figure 29. HEL Beam Etching in Plexiglass Sample

delivered to SABTS and sample test opportunities used by SABTS were caused by sample overrides or test shutdowns triggered by the SABTS itself. In any case, the total number of specimens actually tested was greater than had been planned.

Figures 30b and 30c make similar comparisons between the test objectives and test results for total time-on-target and total lasing device time. Figure 30b plots the total amount of time the specimens were irradiated while Figure 30c shows the total amount of time the BDL device was lasing. Once again, both parameters significantly exceeded the program objectives.

Figure 31 plots total number of laser runs as another parameter of test performance. At the beginning of the program, the test objectives included 42 single specimen runs and 12 multiple specimen runs for a total of 54 runs. The number of single versus multiple specimen runs was continually revised during the course of testing with a final end result of 25 multiple and 11 single specimen runs. This resulted in a total of 36 successful runs. However, since more multiple specimen runs were completed, the total number of specimens actually tested was greater than had been





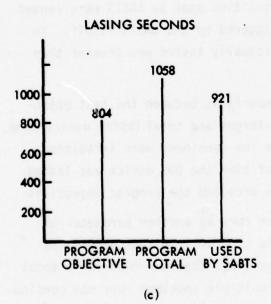


Figure 30. SABTS Test Summary

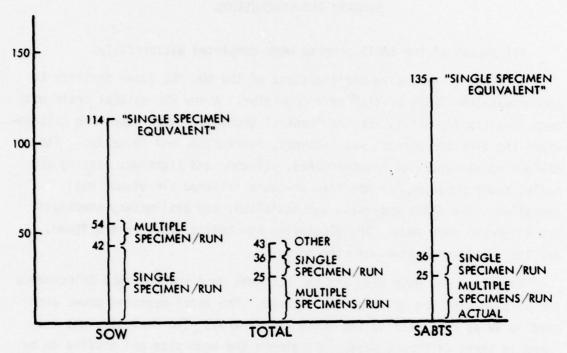


Figure 31. SABTS Lasing Runs Summary

planned. An additional seven runs were made during the test series which dealt with alignment and checkout and included several aborted runs.

Section VI

SUMMARY AND CONCLUSIONS

All phases of the SABTS program were completed successfully.

In Phase I, extensive modifications of the BDL HEL laser facility to accommodate the SABTS program were completed. A new BDL optical train with beam conditioning ducts, HEL beam control shutters, power measuring calorimeters and director mirrors was designed, fabricated, and installed. The SABTS room was enclosed, soundproofed, painted, and lighting, heating and outlet power provided. A positive pressure filtered air blower was installed. The SABTS apparatus was installed, and preliminary checkouts and alignment were made. The BDL cavity and optics train were aligned, and the BDL laser system was checked out.

The alignment HeNe beam and the HEL beam were brought into coincidence and aligned with the SABTS optical system. The total measured power averaged 40 kW as delivered to the SABTS target area. The beam size was measured in three different ways. All showed the beam size and profile to be within the test requirements.

The objectives of Phases II and III were also met successfully. The SABTS acceptance tests were completed, and all specifications which were verified in Phase I were maintained. From a test support point-of-view, all test goals were met or exceeded. For example, a total of 135 test specimens were irradiated by the beam. Only 114 samples had been planned. A total of 357 seconds of available time-on-target were delivered, compared to an estimated 294. Total lasing time for the program was 1058 seconds which can be compared to the 804 seconds estimated at the beginning of the program. In addition, an Add-On Effects Test was successfully integrated and operated for the duration of the Phase III test series.

The following recommendations are made for future tests:

A modification of the experiment to accommodate more specimens per run would allow longer run times and the same data to be obtained in fewer runs with substantial savings. Once a run is started, the additional effort for a 120 second run versus a 5 second run is relatively insignificant.

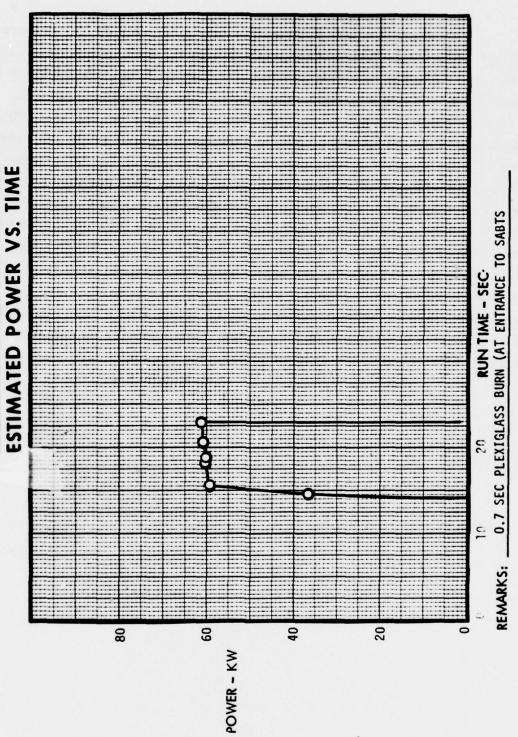
In addition, redundancy in data instrumentation can serve to improve successful data collection. Duplication of equipment, and design of parallel data acquisiton systems can reduce effects of equipment malfunction and operator error.

Detailed test plans with integrated design, procedures and check lists could also be utilized to good effect. These items serve to develop the most efficient path through a testing matrix and to optimize test activities relative to the program's schedule.

APPENDIX

This appendix contains three data sheets for each of the 43 tests in the SABTS series (BDL tests VL1-245 through VL1-287). These data sheets are: (1) Estimated Power versus Time, (2) Planned Time Lines and Quick Look Data Sheet, and (3) Beam Intensity Profile. The first sheet is a plot of device power (kW) versus run time (sec). For the first two tests total device power is determined by summing the power measured at the slow shutter calorimeter and that measured at the fang clipper. The calorimeter at the fang clipper was removed (and placed at the SABTS clipper) in favor of an uninstrumented power dump after the second test. Total power from the third test (VL1-247) to the end of the series was calculated from the power measured at the slow shutter calorimeter using a factor developed from the first two tests. The second sheet, Planned Time Lines ..., indicates the planned and actual sequencing during the tests as well as providing specimen information and exposure times. The Beam Intensity Profile (photos) is that seen by the IR (AGA) camera located at the second turning flat mirror (just upstream of the slow shutter).

ASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-245



PREPARED BY:

TEST AREA) @ APPROX 18.6 SECONDS

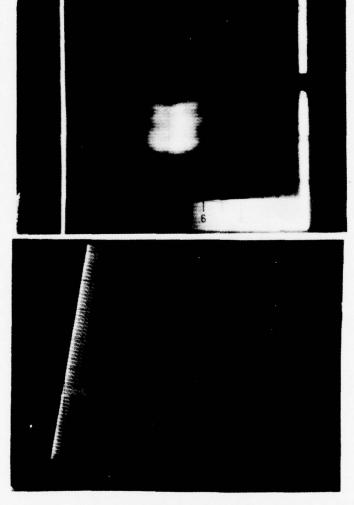
52

			1.18. 67	OPPICT			CCMMENTS	BEALT 1"2001				\$100 (810)		+20		000	+ 10	+22.7	2
			/ PLANTED FORL FUR.	7,7 REVISION	997		ACTUAL SPOT DIAMETER	1				START (SEC)	Nin	2+	11/19		+14	+19.3	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
LINES AND QUICK LOOK DATA SHEET		T:NE 2319	TOTAL COMPLETED TOTAL POSITIONS	DATE 1-7-7	OVATICIA II REFLECTIVE II TRANSANSSIVE	Tabby	EST, PVP. TOTAL AT TARGET POWER	0.19 8.44				ITEM		1 No. 1	0 No. 2	1	CALCRIMETER (SLOW SHUTTER)	"	TCR GT 24/207 PAGE
QUICK LO	QUICK LOOK TEST DATA	77	7.8 (0)	A.S OF	CONTIGUATION DREFLEC		SUICE	17.1					O-GRAPH	SANGALIO No. 1	SANGAMO No.	SATIS SEQ.	CALCRIMETER	ll l	TCR GI
TIME LINES AND	סמוכא 100	DATE / - / -	UASING DURATION (SEC)	53	DWA		TRALISIT TIME TIME FROM (POST EXPOSURE)	18.6				STOP (S2C)							-
PLANNED TH		37542		/ TIME LINES		72.17.50	SKPOSUSE TIME (SEQ)	んじ				START (SEC)	9.1	201			11/14		
		1- 245 PLAN	1.1	PLANNED TEST NO. R.	ROSZHWRT		OTEQUES CONTING NO. DESIGN	PER				IEM	T. C.MEA No. 1	115. 2		7.0. 4	5.781.51		
		TUM INO.	92 CTS VALVE OPEN YEG)	PLANS	F. 3		1551 FCC711ON		53	4			07.1						

AS SEEN BY IR CAMERA VIEWING SIGNAL TURN FLAT

APPROX. TIME (SEC) + 16

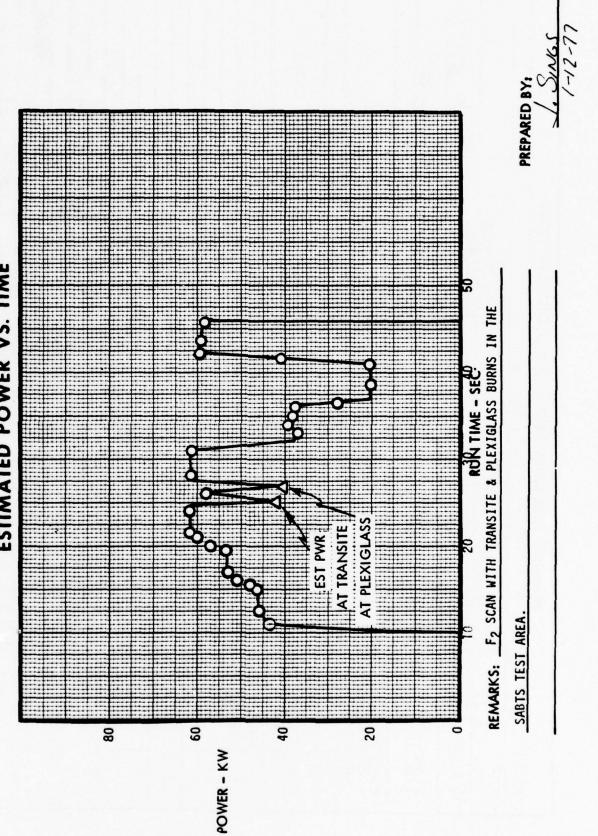
APPROX. TIME (SEC) + 16



*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEF BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-246
ESTIMATED POWER VS. TIME



TEST NO. CONTROL CON				QUICK LCOK TEST DATA	TEST DATA				
D TEST NO. Q-2 TIME LINES AS OF DATE PURNUED PURNU	NO.	5118	\ \		1		001		
Chief Plansed Lines AS OF DATE ///- 77 REVISION Consideration Cons	-		45.8	LASING DURATION (SEC		TOTAL COA			PV.R. 67
Charles Pranse Pranse Consideration	PLANNED TEST NO	8-7	E LINES		AS OF	DAT	V	ZREVISION	U
COATING EXTOSURE TRAFIST TIME EST. PYR. TOTAL SPOT	EXELVENTER 7. ROSZ HAR W. BALL	1000 H	ICAR ICAR	3	CONFIGURATI	ION FLECTIVE ANSMISSIVE			
COMING FXTOSURE TRAFISTIME TIME FROM TIME EST. PVR. TOTAL SPOT COMPLESSION FOR STATE STATE SPOT SOLUTION FROM TIME FROM TIME EST. PVR. TOTAL SPOT SOLUTION FROM TIME EST. PVR. TOTAL SPOT COMPLESSION FOR STATE SPOT COMPLESSION FOR STATE SPOT COLOMBTER SLOW SHUTTER SPOT COLOMBTER SLOW SPOT COLOMBTER SLOW SPOT COLOMBTER SLOW SPOT COLOMBTER SLOW SPOT COLOMBTER SPOT COLOMBTER SLOW SPOT COLOMBT		21.4.N.S				ACT	UAL		
1.0 24.0 23.7 45.5 61.8						EST. PV.R. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
0.7 27.4 29.9 45.5 61.7	PLEXI	1.0		.	23.7	45.5	8.19		
START (SEC) STOP (SEC) ITEM START (SEC)	TRAWS	0.7		27.4	29.9	45.5	2.19		
START (SEC) STOP (SEC) ITEM START (SEC) O.GRAPH N/A O.M SANGAWO No. 1 G.O SABIS SEQ. N/A CALORIMETER (RAVE) (O. 0 O. 0 CALORIMETER (SLOW SHUTTER) O. 0 O. 0									
1 0 N/A SANGAMO No. 1 6.0 3 SANGAMO No. 1 6.0 4 SANGAMO No. 2 N/A 5ANGAMO No. 2 N/A CALORIMETER (SAVE) 10.0 27.0	ITEM	START (SEC		STO? (SEC)		ITEM		START (SEC)	STOP (SEC)
No. 3 SANGAWO No. 1 6.0 No. 3 SANGAMO No. 2 N/A No. 4 SABIS SEQ. V/A CALORIMETER (SLOW SHUTTER) 10.0 AV/A CALORIMETER (SLOW SHUTTER) 22.0	AMERA No. 1		-		O-GRAPI			NIA	
No. 3 No. 4 SABIS SEQ. CALORIMETER (FAW 6) (0.0 CALORIMETER (SLOW SHUTTER) 27. U	1 10.2	NO			SANGAM	0 No. 1			48.0
140. 4 SABTS SEQ. W/A #/A CALORIMETER (FAWG) 10.0 26. A//A CALORIMETER (SLOW SHUTTER) 10.0 26.	Nio. 3				SANGAM	O No. 2		NIA	
WIA CALCRIMETER (SLOW SHUTTER) 10.0 26.					SABTS SE			NIA	0 111
77 776	INST	1110	+		CALOSIM	ETER (FANSETER STEEL)	F)	10.0	76.0
41:14		W/W	H		1	//		27.4	46.0

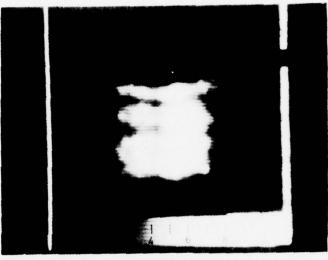
LASER PERFORMANCE ANALYSIS, RUN VL! -246

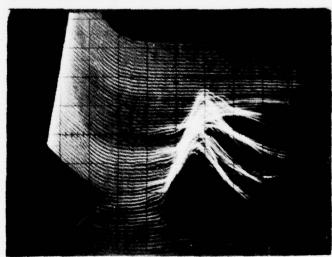
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SELOND TURN FLAT

APPROX. TIME (SEC) + 20

APPROX. TIME (SEC) + ZO

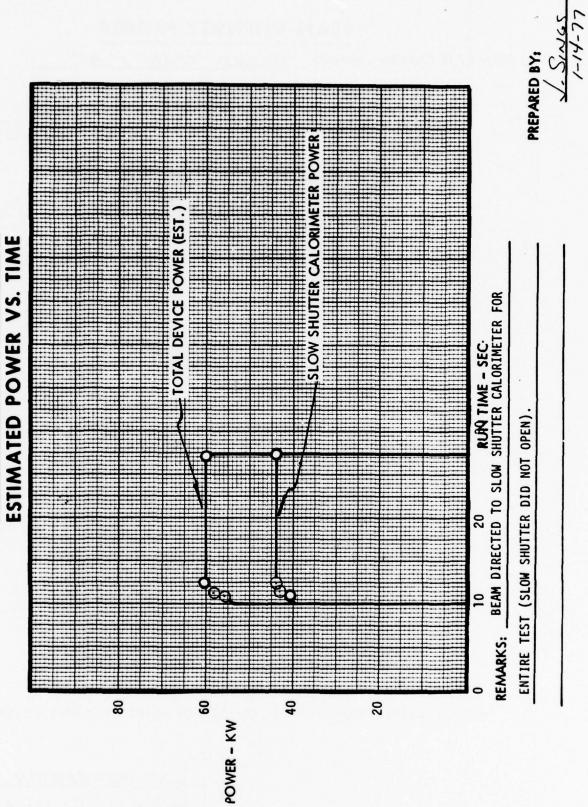




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-247



58

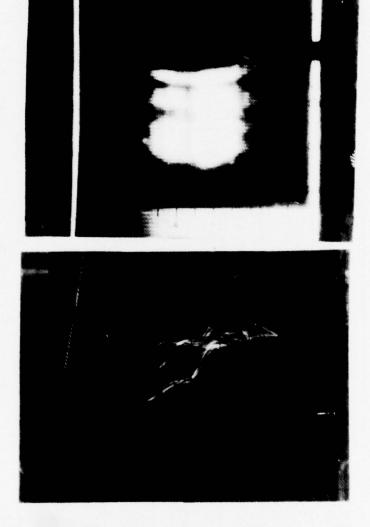
10.4			PLANNE	D TIME LI	NNED TIME LINES AND QUICK LOOK DATA SHEET	ONICK 10	OOK DAT	A SHEET			
D TEST NO. F.G. T.					QUICK LOOK	TEST DATA					
10.4 DEST NO. FAT. TIME LINES LASING SEC 16.9 TEST POSITIONS PLANNED ON THE LINES DUANTION (SEC) 16.9 TEST POSITIONS SEC SEC						-77	TIME 23	20			
COMPINED CONTINUE CONTINUE				:3	ASING URATION (SEC)		TOTAL COA			ANNED ITAL PWR.	29
TRANSPORT TRAN	PLANNED TES	T NO. F.		LINES		AS OF	DAT	E 1-12-7	7 REVISI	1	5/8
CLIEN PLANNED FEAK OKW CHANSMISSIVE CLIANNED FEAK OKW CHANSMISSIVE CLIANNED FEAK OKW CHANSMISSIVE CLIANNED FEAK OKW CHANSMISSIVE CLIANNED FEAK C	EXPERIMENTER		PLANNED LI	NEAR		CONFIGURATI	Z				
SPECIMEN COATING TRANSIT TIME FROM TIME EST. PWR. TOTAL SPOT	D. MULLE	>	PLANNED P				FLECTIVE				
SPECIMEN COATING EXPOSURE TRANSITTIME TIME FROM TIME EST. PWR. TOTAL SPOT SPOT			PLANNED				ACT	UAL			
1 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$		COATING	EXPO	TRANSIT TIME (POST EXPOSURE)		TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETE		OMMENTS
2	1 \$ (P.EX			1.10	14.00						
1	2 \$			1.10	15.35						
15	3			1.10	16.70						
TEM START (SEC) STOP (SEC) ITEM START (SEC) TO CAMERA NO. 1 ON SABIS SEC. No. 2 ON SABIS SEC. O-GRAPH MANUPLI NO. 3 No. 3 ON SABIS SEC. O. O-GRAPH O-GRAPH O. O-GRAPH	*		.25	1.10	18.05						
TEM START (SEC) STOP (SEC) STOP (SEC) START (SEC) STOP (SE			.25	1.10	19.40						
TEM START (SEC) STOP (SEC) ITEM START (SEC) TV CAMERA No. 1 ON SANGAMO No. 2 N/M No. 3 ON SABIS INST. CALORIMETER (SLOW SHUTTER) 16.0 SABIS INST. CALORIMETER (SLOW SHUTTER) 16.0 TOWN SOLEMOID 10.0 26.75 1.			3.00		20.75					-	
TEM START (SEC) STOP (SEC) ITEM START (SEC) TV CAMERA NO. 1 ON SANGAMO NO. 1 O-GRAPH MAN/UPIL N. N. N. A ON SANGAMO NO. 2 N/M SANGAMO NO. 2 N/M ON N. A ON SABIS SEQ. 14.0 ON SABIS SEQ. 14.0 ON ON OLOMINETER (SLOW SHUTTER) 16.0 OO O	16:		TIED		23.73 75.N					-	
TEM START (SEC) STOP (SEC) ITEM START (SEC) TV CAMERA No. 1 ON SANGAMO No. 1 6.0 SANGAMO No. 2 N/H No. 3 ON SANGAMO No. 2 N/H No. 4 ON SABIS SEQ. 14.0 CALORIMETER (SABTS) 14.0 CALORIMETER (SABTS) 14.0 CALORIMETER (SLOW SHUTTER) 16.0 CALORIMETER (SLOW SHUTTER)						26.3		2.09			
TV CAMERA NO. 1	ITEM		START (SEC)	STC	DP (SEC)		ITEM		START (SEC		STOP (SEC)
No. 2	TV CAMERA No	-:	ON	-		O-GRAPI		Y	AANIUAL		THANHA
SANGAMO NO. 2 N/H No. 4 ON SABIS SEQ. CALORIMETER (SABTS) 14.0 23.7 SABIS INST. FIDW SOLEMOND 10.0 76.75 14.0 14.0 14.0 14.0 14.0 14.0	Ž	0.2	ON			SANGAM	0 No. 1		6.0		29.0
SABIS SEQ. 14.0 23.7 SABIS INST. CALORIMETER (SLOW SHUTTER) 16.0 74.0 FIDW SOLENOID 10.0 26.75 " " 23.75 26.7	Ž	0, 3	NO			SANGAM			N/A		
SABTS INST. FLOW SOLENOID 10.0 26.75 " " 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0	Ž		NO			SABTS SEC	ETER (SABTS)		0.4		23.75
FOW SOLENOID 10.0 26.75 " " 23.75	SABTS INST.					CALORIM	ETER (SLOW S	HUTTER	16.0	-	0
C 0,000 10 10 10 10 10 10 10 10 10 10 10 10	HOM!	D/ON:	0.01	22	/5	"	"		23.75		26.75
	# COURTY I	1	20,00	1			7 9/3/0		6	-	

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

TOTAL INTENSITY

APPROX. TIME (SEC)

APPROX. TIME (SEC) 10



*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

			QUICK LOOK TEST DATA	TEST DATA				
S EIRE VALVE	PLAN SABTS		DATE 1-14-77	-77	TIME /	1848		
OPEN (SEC) 10.4	CLOSED (SEC) Z	27.3	DURATION (SEC) 16.9	6.91	TOTAL COMPLETED TEST POSITIONS	WETED 1	PLANNED TOTAL PMR.	FMR. 62
PLANNED TEST NO	NO. P97-/ TIME	TIME LINES		AS OF	DATE	1-14-77	DATE 1-14-77 REVISION	V
EXPERIMENTER	PLANNED L	NEAR		CONFIGURATION	URATION PEFFECTIVE			
D. MULLEN	PLANNED P	PLANNED PEAK 10 KW/CM2	CM2	100	TRANSMISSIVE			
	PLANNED				ACTUAL	UAL		
TEST SPECIMEN COA	COATING EXPOSURE DESIGN TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT SPOT DIAMETER	COMMENTS
1 SEPLEY	.25	01.1	14.00	12.5	16.5			
2 #	.25	1.10	/5.35	NOTE:	ALIGNM	ENT P	PRISM	
*	.25	01:1	16.70	/ N/	WITH C	F BEA	M.	
3 (2 %)	.25	011	18.05					
-	3.00	21.1	27.75					
The state of the s	1	. 0000	23.75	4243				
MONE: BURN !	TEST POS	TION	(C) N	ודע				
ITEM	START (SEC)) STC	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
TV CAMERA No. 1	NO	-		O-GRAPH		N	MANUAL	THUNKIN
No. 2	NO			SANGAMO No.	e. 0		0.9	29.0
	8	1		SANGAMO No.	O No. 2	•	NA	
7. v.	NO	+		SABTS SEQ.	SABTS SEQ.		0.40	23.15
		_		CALORIM	CALORIMETER (SLOW SHUTTER)	(UTTER)	0.0	14.0
HI FLOW SOLFNOID	0.01 0	7.7	75	=	=	2	3.75	27.75

AS SEEN BY IR CAMERA VIEWING SECTIND TURN IFLAT

APPROX. TIME (SEC) 20.0

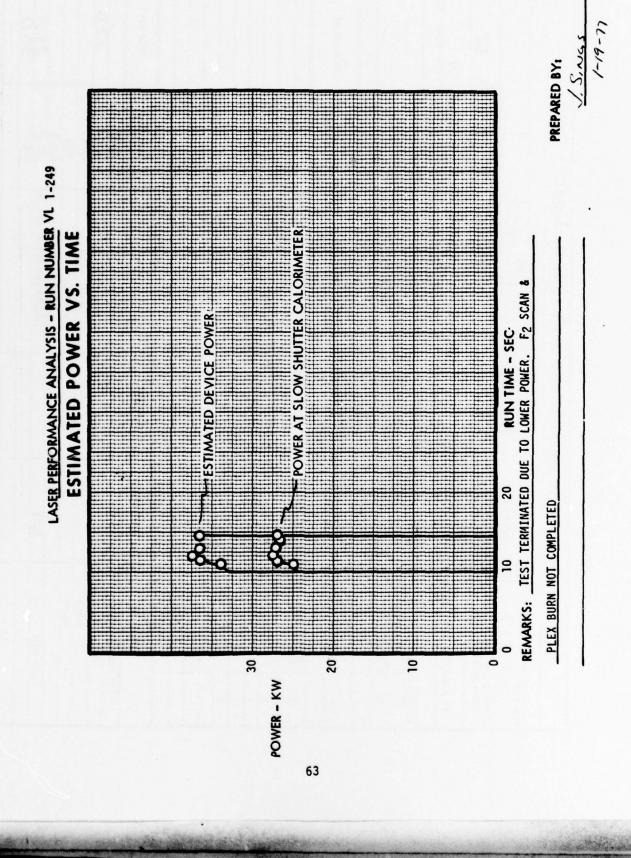
APPROX. TIME (SEC) ZO.O





*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON



CONFIGURATION SEC 4 TEST POSITIONS TOTAL COMMETTED TOTAL COMMETTED TOTAL COMMETTED TOTAL TOTAL COMMETTED TOTAL COMMETTED TOTAL TOTAL TOT	ASING ASING (SEC) (ASING ASING	TIME LINES TIME LINES TIME LINES CONFICATION NINED FEAK (DENSITY VINED SOURE (POST E (SEC) EXPOSURE (POST E (SEC) EXPOSURE (POST E (SEC) EXPOSURE (POST E
14. 5 DUBATION (SEC) 4. 1 TEST POSITIONS 0 TOTAL PAR.	AS ASING SEC) AS INE FROM F2 ON TOWN	ME LINES ME LINES ED LINEAR FICATION ED FEAK NSITY D D EXPOSUR FC
TIME LINES AS OF DATE /- /? 77REVISION AGNING LINE LINE LEST, PMR. LOTAL SPOT LOTAL LOTAL SPOT LOTAL L	11ME FROM F2 1 24.0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	PLANNED LINEAR MAGNIFICATION PLANNED FEAK PLANNED FEAK PLANNED FEAK (POST TIME (SEC) EXPOSURE (POST TIME (SEC) EXPOST TIME (POST TIME (SEC) EXPOST TIME (SEC) EX
NNED LINEAR GONFIGURATION GONFICATION NNED TRANSMISSIVE DIRANSMISSIVE DIRANSMISSIVE DISCRIPTION TO STOP (SEC) SANGAMO No. 1 SANGAMO No. 2 SANGAMO NO. 3 S	TIME FROM FROM DT. WITH WITH WITH WITH WITH WITH WITH WITH	PLANNED LINEAR MAGNIFICATION PLANNED PEAK PWR DENSITY PLANNED EXPOSURE (POST TIME (SEC) EXPOSUR
SEC	11ME FROM F2 1 24.0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	NNED OSURE (POST EXPOSUR) (AMAGE) (AMAGE) (AMAGE) (AMAGE) (AMAGE) (AMAGE) (AMAGE)
E (SEC) E (TIME FROM F2 24.0	OSURE (POST EXPOSUR) (POST EXPOSUR) (POST EXPOSUR)
PANT SHIPT DEWN FREED STEP OF	DCWN DCWN	R WAS ST.
FOR WING SHIPT DURINGS FIRST STEP OF E.C. RT (SEC.) STOP (SEC.) STOP (SEC.) SANGAMO No. 1 SANGAMO No. 2	WER WA	CON AS
RT (SEC) STOP (SEC) RT (SEC) STOP (SEC) SANGAMO No. 1 SANGAMO No. 2 SANGAMO No. 3 SANGAMO No. 2 SANGAMO No. 2 SANGAMO No. 3 SANGAMO No. 2 SANGAMO No. 3 SANGAMO		611
NAT (SEC) STOP (SEC) ITEM O-GRAPH SANGAMO No. 1 SANGAMO No. 2 SANGAMO NO. 2		757.
N		
O-GRAPH SANGAMO No. 1 SANGAMO No. 2 SANGAMO No. 2 SANGAMO No. 2 CALORIMETER (SABIS) CALORIMETER (SLOW SHUTTER) 11 1 1 1 2	STOP (SEC)	
SANGAMO No. 1 SANGAMO No. 2 N SABTS SEQ. CALORIMETER (SABTS) (1 1 1 1 2	0-0	ON
SANGAMO No. 2 N. SABIS SEQ. SABIS SEQ. CALORIMETER (SABIS) CALORIMETER (SLOW SHUTTER) (1 1 1 1 2 24)	SAN	
W	SAN	
4	SAB	
W	75	11/4
The state of the s	3	N/H
		REF: 1

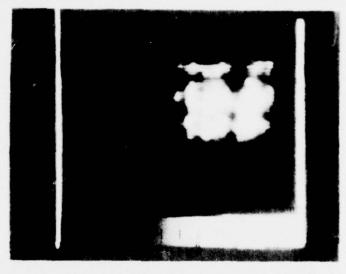
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

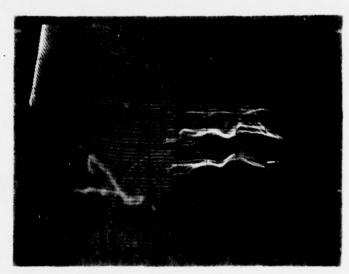
TOTAL INTENSITY

APPROX. TIME (SEC) 12.0

LINEAR PROFILE*

APPROX. TIME (SEC) 12.0

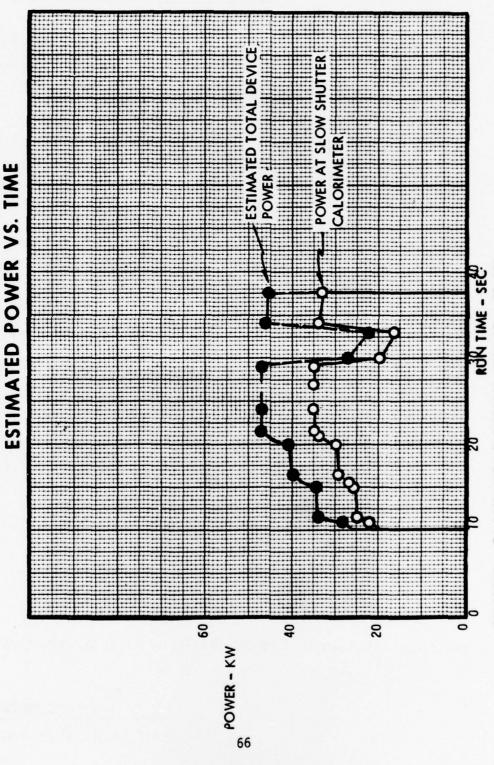




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-250



PREPARED BY:

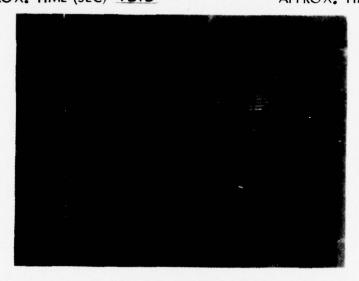
REMARKS: F2 SCAN WITH PLEXIGLASS BURN AT ~ 25 SEC

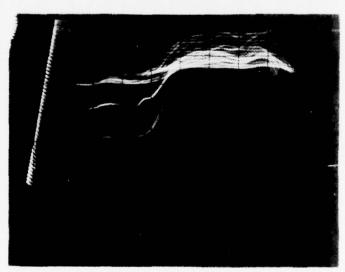
DATE				
, , ,	1-18-77	TIME 2212		
37.6	LASING DURATION (SEC) 27.2	TOTAL COMPLETED TEST POSITIONS	/ PLANNED TOTAL PWR.	r. 67
R-3 TIME LINES	AS OF	DATE /-/7-	DATE /-/7-77 REVISION	A
PLANNED LINEAR MAGNIFICATION PLANNED FEAK PWR DENSITY	CONFIGURATION REFLEC	JRATION REFLECTIVE TRANSMISSIVE		
PLANNED		ACTUAL		
TRANSIT TIME (POST EXPOSURE)	TIME FROM TIME SLICE	EST. PWR. TOTAL AT TARGET POWER	ACTUAL SPOT DIAMETER	COMMENTS
5.0	24.0 24.3	35.4		
START (SEC) STOP (SEC)		ITEM	START (SEC)	STOP (SEC)
ON	O-GRAPH		N/A	
	SANGAMO No.	0 No. 1	6.0	37.0
	SANGAMO No.	O No. 2	N/A	
	SABTS SEQ.	Ġ	W.W	
	CALORIM	CALORIMETER (SABTS)	NA	
NA	CALORIM	CALORIMETER (SLOW SHUTTER)	0.01	24.0
	-	1. 1	24.7	35.0

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 18.0

APPROX. TIME (SEC) /8.0

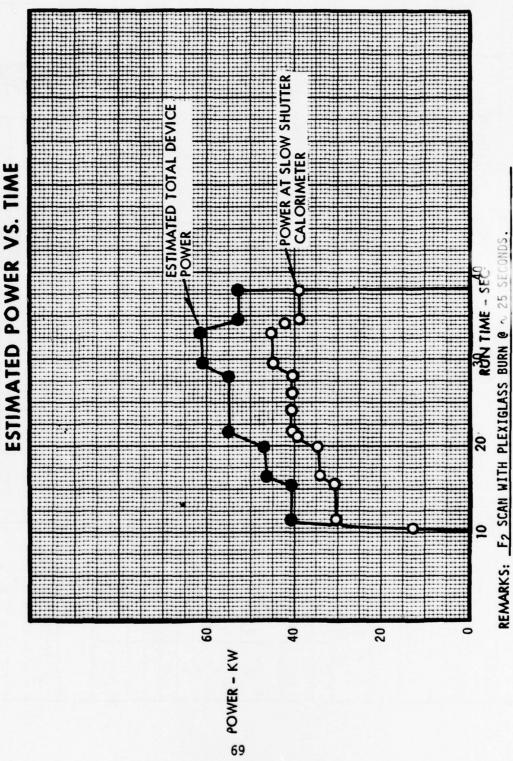




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-251



The colone is a	D TEST NO. R-4 O TEST NO. R-4 OLICE SECURING CIMEN COATING CIMEN COATING FLANI F	3 3 3	LOOK IEST DATA				
10 4	D TEST NO. R-4 D TEST NO. R-4 D TEST NO. R-4 MAGE CIMEN COATING FLANI FL	2		TIME		-	
10.4	D TEST NO. R-4 D TEST NO. R-4 OLL PLAN	2	1-19-77	2	315		
P4 TIME LINES PLANNED LINEAR CONFIGURATION	NG EXPO NG TIME ON START	E LINES	N (SEC) 27.4	TOTAL COM TEST POSITION	NETED /	TOTAL	
PLANNED LINEAR MAGNIFICATION PAR DENSITY PLANNED FEAK PLANNET FEAK PLA	24 2	LINEAR	AS OF	DATE	1-19-77	REVISION	OR16
SPECIMEN COATING EXPOSURE (POST TIME (FC)) TIME FROM (POST TIME (POST	SPECIMEN COATING EXP NO. DESIGN TIM TIEM STA CAMERA NO. 1 0	FEAK	CONFIGURAT	ION FLECTIVE ANSMISSIVE			
SPECIMEN COATING EXPOSURE TRANSIT TIME FROM TIME EST. PWR. TOTAL STOT STOT	SPECIMEN COATING NO. PESIGN DESIGN TEM TEM TABLE TO THE TABLE TABLE TO THE TABLE TABL			ACTL	ML		
PLEX	ITEM IV CAMERA No. 1	TRANSIT TIME (POST EXPOSURE)		EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
TV CAMERA No. 1 O/N START (SEC) STOP (SEC) ITEM START (SEC)	ITEM IV CAMERA No. 1	2	+		41.1		
TY CAMERA No. 1 0 0 0 0 0 0 0 0 0	ITEM IV CAMERA No. 1						
1EM START (SEC) 1 1EM START (SEC) 1 1 1 1 1 1 1 1 1	ITEM IV CAMERA No. 1						
ITEM START (SEC) STOP (SEC) ITEM START (SEC) IV CAMERA No. 1 O/N SANGAMO No. 1 E.O No. 2 SANGAMO No. 2 O/O No. 4 SANTS SEQ. O/O SANTS INST. O/O O/O SANTS INST. O/O O-GRAPH	ITEM IV CAMERA No. 1		32.7		45.6		
START (SEC) STOP (SEC) ITEM START (SEC)							
START (SEC) STOP (SEC) ITEM START (SEC)							
START (SEC) STOP (SEC) ITEM START (SEC)							
1 ON O-GRAPH 2 SANGAMO No. 1 6.0 3 SANGAMO No. 2 NV.P. 4 SABIS SEQ. CALORIMETER (SABIS) NV.P. CALORIMETER (SABIS) NV.P. 1, 1, 1, 24,7 3	2 0			ITEM	-	START (SEC)	STOP (SEC)
No. 2 No. 3 No. 4 No. 6 No. 7 No	2 97		O-GRAPI	_		MM	
No. 3			SANGAN	10 No. 1	6	5.0	37.0
Å. ↑	No. 3		SANGAM	10 No. 2	V	W	
N/A	76. 4		SABTS SE	Ċ	<		
	N		CALORIN	ETER (SLOW SH	UTTER	0.7	24.0
			1	"	2 1	47	380

LASER PERFORMANCE ANALYSIS, RUN VL 1-251

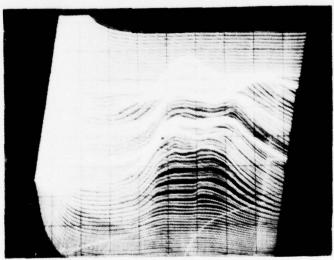
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECUND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20

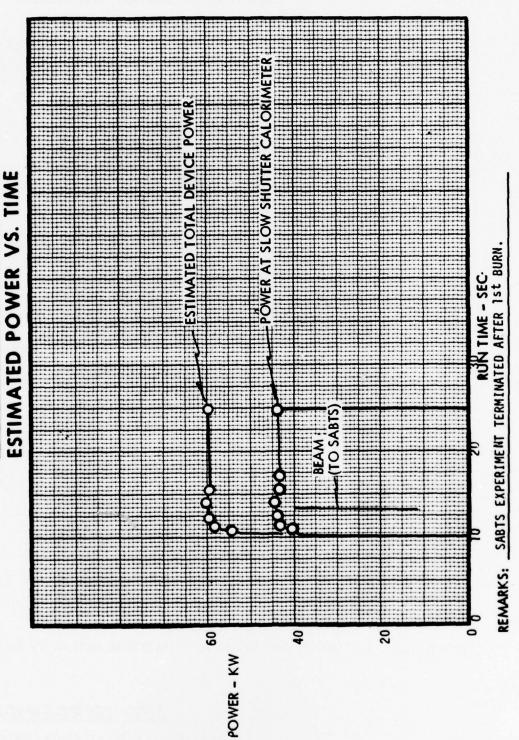




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL1-252



			PLANNED	NNED TIME LINES AND QUICK LOOK	HES AND QUICK	QUICK LC	OOK DATA	A SHEET		
0.4.		1			AGEN FOOM	AINO ICI	2000		-	
KUN NO. 11-252	7-552	KAN	SABTS		1-21-77	-77	TIME /	1734		
D2 FIRE VALVE OPEN (SEC)	10.4	D2 FIN	CLOSED (SEC) 24	24.8 bu	DURATION (SEC) 14.4	14.4	TOTAL COMPLETED TEST POSITIONS	APLETED ONS	TOTA	PLANNED 59
PLAN	PLANNED TEST A	NO. FAT-2	-	IME LINES		AS OF	DAT	DATE /-19-77	REVISION	00 2
EXPERIMENTER	TER		PLANNED LI	VEAR		CONFIGURATION	20			
0. 1	MULLEN		PLANNED PE	PLANNED FEAK 40-45 KW/CM	KW/CM		REFLECTIVE TRANSMISSIVE			
			PLANNED				ACTUAL	UAL		
TEST	SPECIMEN O	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-	* CPLEY		.25	1.10	14.00	14.0	44.0			
2	*		.25	1.10	15.35					
3	**		.25	1.10	16.70					
1	**		.25	01.1	18.05					
5	*		.25	1.10	19.40					
•	* & PLEX		3.00		20.75					
	NO TE:	"KPIDER"	ER" DE	TELTOR	STOPPE	O3da	1531	BETTER	13/	SPECIMEN
	ITEM		START (SEC)	STO	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
7	TV CAMERA No. 1		NO			O-GRAPH		7	MANUAL	MANUAL
	No. 2		NO			SANGAMO No.	O No. 1		0.9	0.62
	No. 3		NO			SANGAMO No.	O No. 2		N/A	
	No. 4		ON			SABTS SEQ.	ď	`	14.0	23.75
						CALORIM	CALORIMETER (SABTS)	1	4.0	23.75
	SABTS INST.					CALORIM	CALORIMETER (SLOW SHUTTER)	HUTTER)	0.0	14.0
HI FL	FLOW SOLENOLD	alla	10.0	27.	(5	1	"	" 2	22.75	27.75
* NP!		19010	BOIL COLORIMETER			TCR ML	TCR M2-2/361	PAGE	M	4
1111			11111							

BEAM DIAGNOSTICS ENGINEER

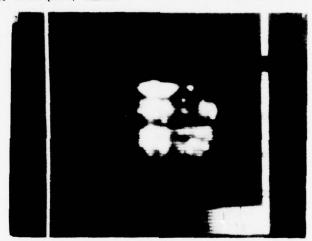
LASER PERFORMANCE ANALYSIS, RUN VL1-252

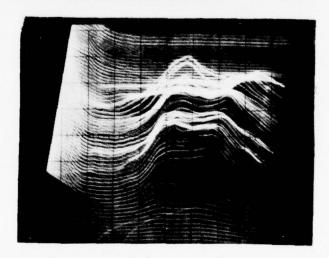
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20

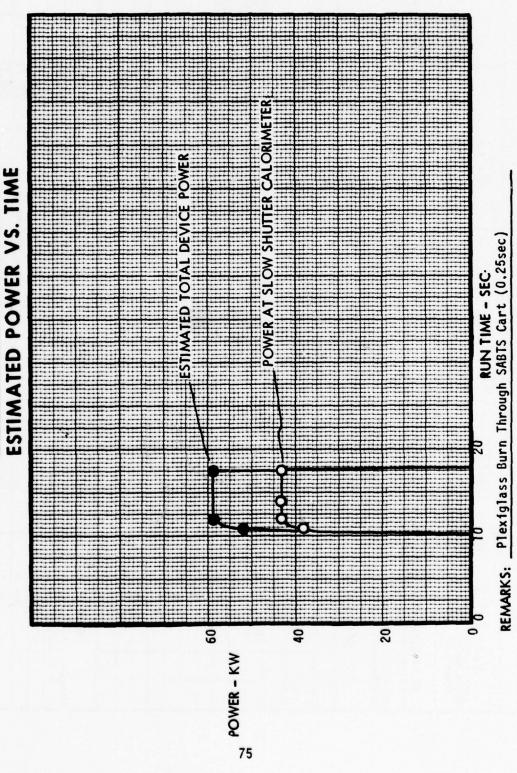




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-253



@ 14.+ Sec.

TRIM NO TEST TRIM SABTS TRIM SABTS TRIM SABTS TRIM	D TEST NO. FAT. CIMEN COATING NO. DESIGN		F TIME FEET TO TEST TEST TO TEST TEST TEST TEST	2211 COMPLETED OSITIONS ATE /-2/-7	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
TOOL COMPLETED LUSING SEC 7.2 TOTAL DUMETED TOTAL PMR.	T NO. FAT. COATING DESIGN		OF FIGURATION TRANSM TRANSM TRANSM	COMPLETED OSITIONS	1 250 1	
THE PLANINED LINEAR PLAN	NED TEST NO. FAT. MULLEN SPECIMEN COATING NO. PLEX		OF FIGURATION DIREFLECTI TRANSM	ATE /-2/-7.	-	
The continue The	SPECIMEN COATING NO. PLEX		NFIGURATION DIRECTIVE TRANSMISS TIME EST. P.		7 REVISIO	
SPECIMEN COATING EXPOSUBE (POST) TIME FROM (LOST) TIME (LOST) PLE) PIEX . 25 14,00 14,0 0.43,5 0.0F (COMMER (LOST) 0	SPECIMEN COATING NO. PLEX	45 KWLM ² TIME TIME FROM P ₂ 14.00	1			
SPECIMEN COATIING EXPOSIDE TIME FROM TIME EST. PMR SPOTE DIAMETER DI	SPECIMEN COATING NO. DESIGN	TIME TIME FROM F2 14,00		IVE		
SPECIMEN COATING EXPOSINE TRANSIT TIME TIME EST. PWR. TOTAL STOTE ST	SPECIMEN COATING EXPOSURE NO. DESIGN TIME (SEC)			ACTUAL		
PLEX .255 14,00 14.0 43.5 PLEX	PLEX .	1	_		ACTUAL SPOT DIAMETER	COMMENTS
14.25			+	5		PLEX IN FA
ITEM START (SEC) ITEM						OF CONVE
ITEM START (SEC) STOP (SEC) ITEM START (SEC) IV CAMERA No. 1 O/N SANGAMO No. 1 E. O No. 2 II SANGAMO No. 1 E. O No. 4 II SANGAMO No. 2 II O/N No. 4 II SANGAMO No. 2 II O/N SABIS INST. CALORIMETER (SABIS) II O/O SABIS INST. CALORIMETER (SABIS) II O/O FLUIW SOLENDIO IO. O I.7.75 II II II II II II II	9					YOU WILL
ITEM START (SEC) STOP (SEC) ITEM START (SEC) IV CAMERA No. 1 O/N SANGAMO No. 1 E. O SANGAMO No. 2 N/A No. 3 II SANGAMO No. 2 N/A No. 4 II SANGAMO No. 2 N/A SABIS INST. CALORIMETER (SABIS) I.4. O SABIS INST. II II I.4. O SABIS INST. II II II II II II II SABIS INST. II II II II II II II SABIS INST. II II II II II II II	9					
ITEM START (SEC) STOP (SEC) ITEM START (SEC) TV CAMERA No. 1 ON NA. 2 NA. NA. No. 2 II SANGAMO No. 1 E. O SANGAMO No. 2 NA. O No. 3 II SANGAMO No. 2 NA. O SABIS INST. CALORIMETER (SABIS) I. O. O SABIS INST. CALORIMETER (SLOW SHUTTER) I. O. O SABIS INST. II II II II II II II						
TV CAMERA No. 1				\parallel	\coprod	
TV CAMERA No. 1		STOP (SEC)	ITEM		START (SEC)	STOP (SEC)
No. 3 11 SANGAMO No. 1 6.0 20.0 No. 4 11 SANGAMO No. 2 N A 14.0 SABIS INST. 14.0 14.0 CALORIMETER (SLOW SHUTTER) 10.0 14.0 FLOW SOLENDID 10.0 17.75 11.0 10.0 17.75 17.0 10.1 14.25 17.0 10.1 17.0 17.	79.1		O-GRAPH		MAN.	MAN.
No. 3 11 SANGAMO No. 2 N A 14.2 14	2		SANGAMO No. 1		6.0	20.0
SABTS SEQ. 14.0 14.2 SABTS SEQ. 14.0 14.2 SABTS INST. CALORIMETER (SLOW SHUTTER) 10.0 14.2 14.1 11.25 17.1					N A	
SABTS INST. SABTS INST. FLOW SOLEWOLD 10.0 17.75 4, 1, 1, 14.25 17.7	-	+	SABTS SEQ.		14.0	14.25
FLOW SOLENBID 10.0 17.75 ", " " 14.25 17.7	SABIS INST.		CALORIMETER (SLO	OW SHUTTERY	10.0	14.00
	FLUW SOLENDIO 11	17.75	" "	"	14.25	17.75

LASER PERFORMANCE ANALYSIS, RUN VL1-253

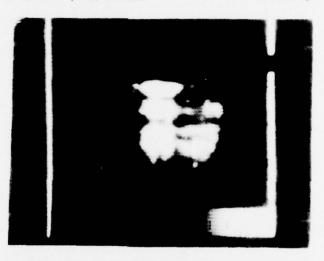
BEAM INTENSITY PROFILE

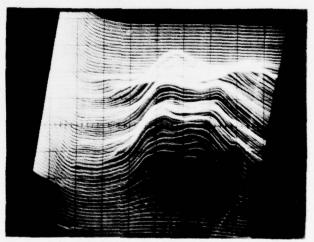
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

TOTAL INTENSITY

APPROX. TIME (SEC) 14.6

APPROX. TIME (SEC) 14.0

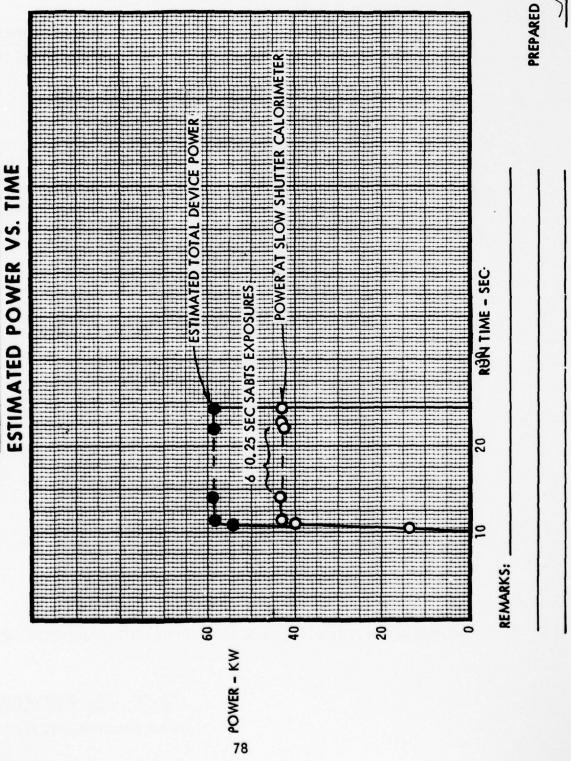




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-254



1. Sincs

W1-254	-			QUICK LOOK TEST DATA	TEST DATA				
#11. C54	TEST			DATE		TIME	0		
一 田田 いまこづき	5	JABIS		1-26	11-77-	V	4127		
CHIN 1840 10.4	01 S	CLOSED (SEC) 2	24.3	LASING DURATION (SEC)	13.9	TOTAL COMPLETED TEST POSITIONS	APLETED 6		PLANNED 59
PLANNED TEST NO. CE-1	0. CE		TIME LINES		AS OF	DATE	1-12-1	1-21-77REVISION	N A
EXPENSENTER		PLANNED LI	NEAR HON	2	CONFIGURATION	NO			
D MULLEN		PLANNED PEAK	AK 8.2 K	8.2 KW/CM2		TRANSMISSIVE			
		PLANNED				ACT	ACTUAL		
TEST SPECIMEN CO	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST, PWR, AT TARGET	TOTAL	ACTUAL SPOT DIAMETER CM	COMMENTS
	HUGHES 3	.2	1.10	14.00	14.0	29.6	65	2.29	
2 A2 DC	7F 2	.25	01.1	15.35		27.6		*	
\dagger	7 17	25	017			29.2		<u> </u>	
0	8 11	.25	1.10	19.40		19.6		-	
6 A6 P	W	.25		20.75		28.0		2.29	
				00:12	23.7		59		
ITEM	-	START (SEC)	STS	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
TV CAMERA No. 1	1	NO	-		O-GRAPH		-	MAN.	MAN.
No. 2		ON			SANGAMO No.	O No. 1		0.9	28.0
No. 3		ON			SANGAMO No.	O No. 2		NA	
92	+	ON			SABTS SEQ.	Ġ	+	14.0	21.0
CARTC INCT	+		+		CALORIM	CALORIMETER (SABTS)	AL LITTE BY	2.0	21.0
HI FLOW SOLENDID	9/0/	10.0	24.5	5	1	11	1	21.0	24.5

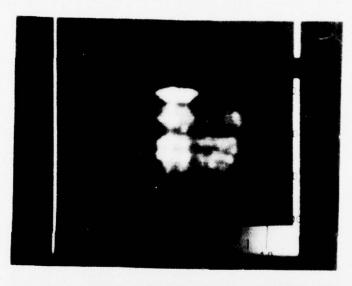
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

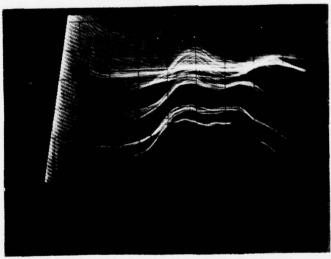
TOTAL INTENSITY

APPROX. TIME (SEC)

LINEAR PROFILE*

APPROX. TIME (SEC)

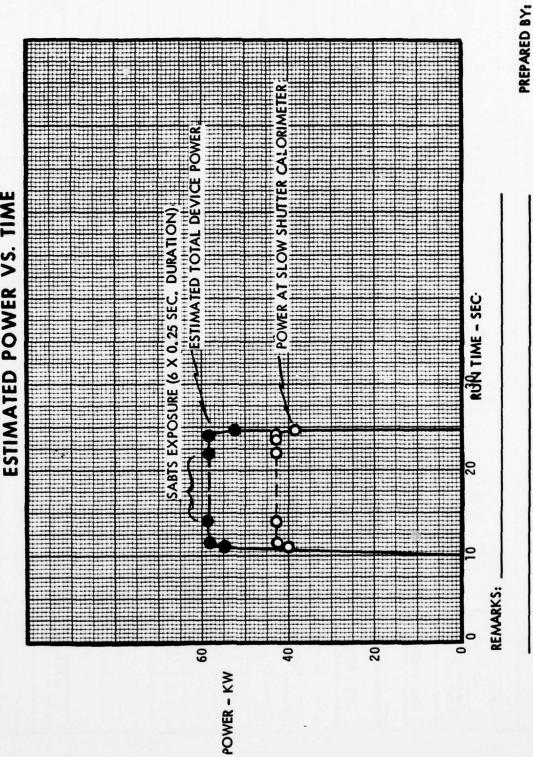




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-255
ESTIMATED POWER VS. TIME



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						VIVO ICI				
ž Ž	RUN NO. VII- 255	Z Z	N SARTS		DATE 1-24	-24-77	TIME 18	1852		
D2 FIRE VALVE OPEN (SEC)	10.4		D2 FIRE VALVE CLOSED (SEC)	24.1	LASING DURATION (SEC)	13.7	TOTAL COMPLETED TEST POSITIONS	WETED 6	PLANNED TOTAL PWR.	Mr. 59
PLAN	NED TES	PLANNED TEST NO.CE-2		TIME LINES		AS OF	DAT	1-22-1	DATE 1-22-77 REVISION	89
EXPERIMENTER	TE		PLANNED LINEAR MAGNIFICATION	INEAR /		CONFIGURATION	JRATION REFLECTIVE			
D. 1	MULLEN	N :	PLANNED P	EAK 8.2KI	8.2KW/CM2	. DT&	TRANSMISSIVE			
			PLANNED				ACTUAL	UAL		
TEST POSITION	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST, PWR, AT'TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-	18	HUGHES	Γ.	1.10	14.00	14.0	292	59	229	
~ -	B2 B3	DOF 3		011	عالما		23.2 21.8		¥	
	84	0011 5	1	01:1	18.05		30.0			
5	85	-	L	1.10	19.40		/8.3		•	
9	98	B 34	+		2075		20.5		2.29	
					00.12	23.6		29		
	ITEM		START (SEC)	STC	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
7	TV CAMERA No.	-	NO	-		O-GRAPH		-	MAN.	MAN
	2	. 2	"			SANGAMO No.	0 No. 1		6.0	28.0
	Š	.3	"			SANGAMO No.	0 No. 2		NA	
	Ž	+	-			SABTS SEQ.	SABTS SEQ.	1	14.0	21.0
1	IS INST.					CALORIME	CALORIMETER (SLOW SHUTTER)	UTTER	0.01	14.0
HI FLL	FLOW SOL	SOLENDID	10.0	2	24.5	1,1	-		21.0	24.5

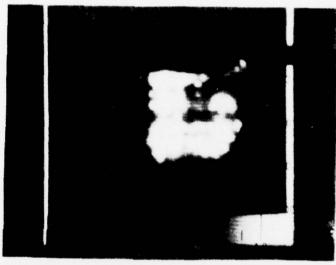
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

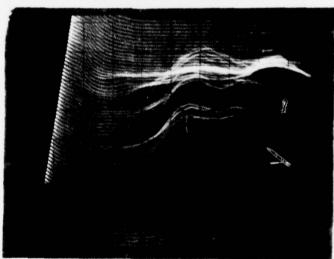
TOTAL INTENSITY

APPROX. TIME (SEC)

LINEAR PROFILE*

APPROX. TIME (SEC)

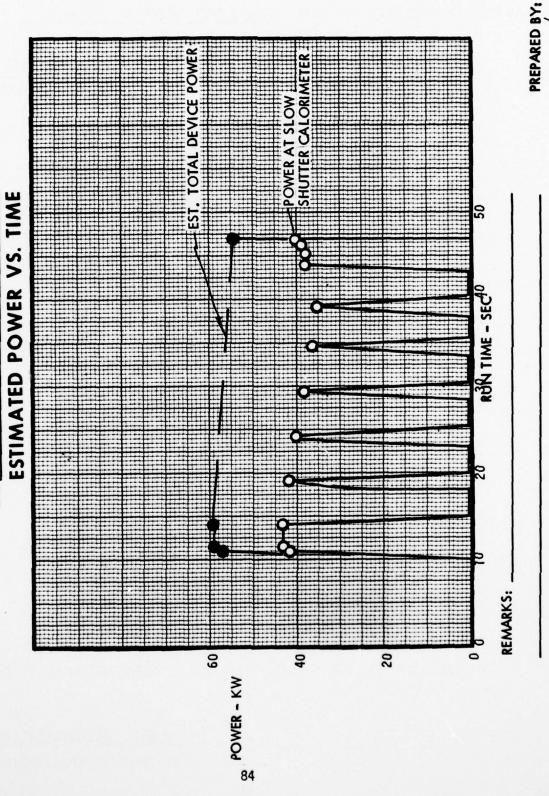




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-256

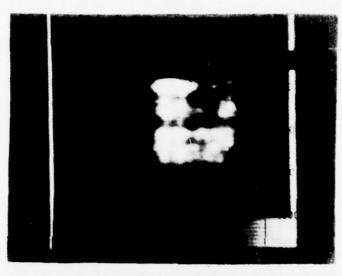


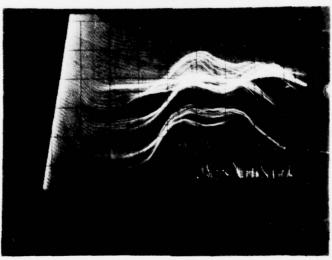
					QUICK LOOK TEST DATA	TEST DATA					
RUN NO.	WI-256	PAN A	SABTS		DATE 1-24	1-24-77	TIME 2	2134			
D2 FIRE VALVE OPEN (SEC)	EC) 9.9	OL OSI	D2 FIRE VALVE CLOSED (SEC) 46	46.8	LASING DURATION (SEC)	36.9	TOTAL COMPLETED TEST POSITIONS	APLETED 6		PLANNED TOTAL PWR.	29
PLAN	PLANNED TEST NO. CE-9	O.CE.		TIME LINES		AS OF	DATI	DATE/-/7-77 REVISION	7 REVISI		ORIG
EXPERIMENTER	ITER		PLANNED LINEAR MAGNIFICATION	27		CONFIGURATION	JRATION SPEFLECTIVE				
D.	MULLEN	_	PLANNED PE		B. Z KW/CM2	MT [TRANSMISSIVE				
			PLANNED				ACTUAL	UAL			
TEST POSITION	SPECIMEN CC NO. D	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	AE TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER		COMMENTS
-	H 12	HUGHES S	4.0	1.10	14.00	17.6	25.8	59	2.29		
3 8	100 27		4.0	97	19.10	- 7.22	24.9		*		
-	C4 0CI	9 11	4.0	01.1	29.30						
5	72 00	1 113	4.0	1.10	34.40	105	2/8		279	+	
•	+	1	21		43.50	42.1	2	29	7		
						46.0		54			
	ITEM		START (SEC)	5	STOP (SEC)		ITEM		START (SEC)	-	STOP (SEC)
2	TV CAMERA No. 1	+	NO			O-GRAPH	-		MAN.		NON.
	No. 2		NO			SANGAMO No.	10 No. 1		0.9		0.64
	No. 3		ON			SANGAMO No.	10 No. 2		NIA	1	
	No. 4	+	NO			SABTS SEQ.	d	1	0.4	+	43.5
SA	SABTS INST	+		+		CALORIM	CALORIMETER (SLOW SHUTTER)		0.0	+	14.0
HI FL	FIOW SOLFNOID	011	10.0	4	47.0	11	1	4	13.5	H	47.0
										1	

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20





*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

BDL TECHNOLOGY PROGRAM

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-257

SABTS

TEST SERIES SHOT NUMBER

DATE (MO/DAY/YR) 1-26-77

D₂ FIRE VALVE OPEN (SEC) 10.4 D₂ FIRE VALVE CLOSED (SEC) 24.2 LASING DURATION (SEC) 13.80

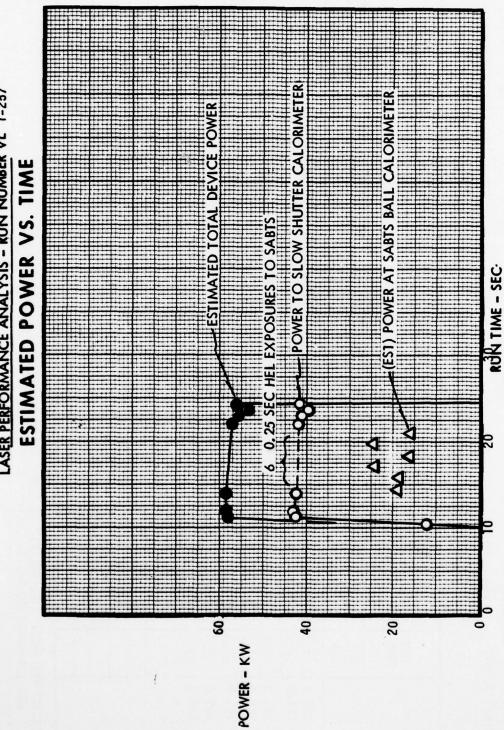
PERFORMANCE PARAMETERS AT SELECTED TIME SLICES

	V 10 20	V			4.84	4.89	4.82	4.88	4.92	4.85	4.92					,
Power Ball	Calori- meter	Power	KW		29.5	23.4	14.4	24.4	24.4	24.0	20	19.8	0=3.76			
, x	· œ															
SLOW SHUTTE	SHROUD CALORIMETER Ps2d	POWER	KW		42.6	1	1	1	1	ı	47,2					
	SHROUD Ps2d	PS	TORR		6.7	6.7	8.9	6.9	8.9	6.9	7.0					
AVERAGE MODULE	37ZZON	ΔĪ	Jo.		30.1	30.4	30.6	31.3	30.8	30.9	31.1					
ERAGE A	COMBUSTOR	ΔT	٥F		23.3	24.8	25.3		26.2	26.6	27.2					
	COMB	P _C	_		11,2	11.2	11.2	11.2	11.2	11.2	11.2					
CAVITY FLOW	DIL		G/SEC G/SEC		1	1	1	1	1	1	1					
CAVITY	FUEL	D2	G/SEC		121.6	121.3	121.7	121.7	121.7	121.8	121.7					
	DILUENT	유	G/SEC		149.0	149.1	148.9	149.2	148.8	148.8	148.9					
FLOW	DILL	z	G/SEC		ı	1	1	1	1	ı	1					
COMBUSTOR FLOW	FUEL	H ₂	G/SEC		9,20	9.17	9.20	9.19	9.20	9.19	9.22					
CO	OXIDIZER	F ₂			266.8	267.2	266.4	267.4	268.2	266.7	268.6					
	SLICE		SEC	N/A	13.5	15.6	16.5	17.9	19.1	20.4	23.1					
			EF2Rc		266.0	266.0	265.0		*265.5	265.0	(1) 266.3					
				87	,	Ξ	Ξ	Ξ	Ξ	Ξ	Ξ			41		•

NOTES AND DR'S: SLIGHT DIP IN POWER @ END OF TEST (1) 6 0.25 SEC HEL EXPOSURES TO SABTS. TCIP = 71°F *EF2RC 212 @ one PT 19 + SEC.

PREPARED BY: 1. 5,045

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-257



REMARKS:

PREPARED BY:

J. Sings

1-27-77

88

					200 200 200 200	200				
RUN NO.	VII- 257	5.7 PLAN	SABAS		DATE 1-26-77	-77	TIME 17	1715		
D2 FIRE VALVE OPEN (SEC)	M 10.4		D2 FIRE VALVE CLOSED (SEC)	24.2	DURATION (SEC) 13.80	13.80	TOTAL COMPLETED TEST POSITIONS	WALETED 6		PLANNED 59
PLANA	VED TES	PLANNED TEST NO. CF-4		TIME LINES		AS OF	DAT	DATE /-24-77REVISION	7REVISI	ON ORIG
w	TER		PLANNED LI MAGNIFICA	PLANNED LINEAR 2.2		CONFIGURATION BEFLEC	JRATION BREFLECTIVE	430		
0. 1	MULLEN	*	PLANNED PE PWR DENSIT	X 921 X	W/CM2	D TR.	☐ TRANSMISSIVE			
			PLANNED				ACI	ACTUAL		
TEST SOSITION	SPECIMEN NO.	COATING	EXPOSURE TIME (SEC)	TRANSIT TÍME (POST EXPOSURE)	TIME FROM	TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-	BI	HUGHES	. 25	1.10	14.00	14.4	19.2	58.5	1.6	
2	82	DOF	.25	01.1	15.35		20.4		<	
1	84	סכנו	.25	1.10	(8.05		16.4			
5	85	סכרו	.25	1.10	19.40		24.4		>	
0	88	P.E	.25		20.75		16.0		1.6	
					40.15	23.1		2.95		
	ITEM		START (SEC)	STO	STOP (SEC)		ITEM		START (SEC)	STOP (SLC)
77.0	TY CAMERA No.	-	NO			O-GRAPH			MAN	MAN
	No. 2	. 2				SANGAMO No.	0 No. 1		0.9	280
	No. 3	. 3	"			SANGAMO No.	O No. 2		N/A	
	Ž.	1	,			SABTS SEQ.	SABIS SEQ.	<i>'</i>	0.40	21.0
SABT	SABTS INST.	+		+		CALORIME	CALORIMETER (SLOW SHUTTER)		00	14.0
HI FLO	FLOW SOLENOID	O/ON.	0.01	5	24.5	"	"	:	0.1	24.5

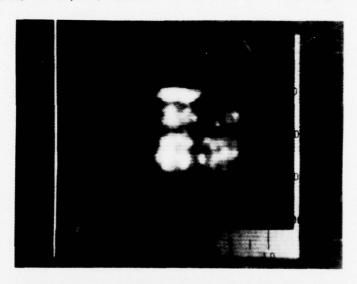
LASER PERFORMANCE ANALYSIS, RUN VLI-257

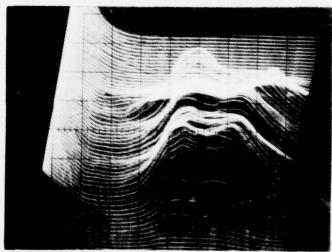
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20

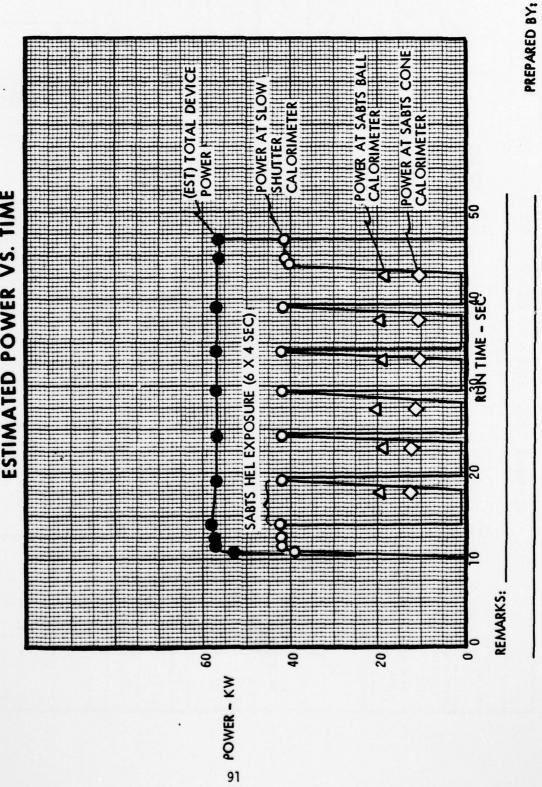




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

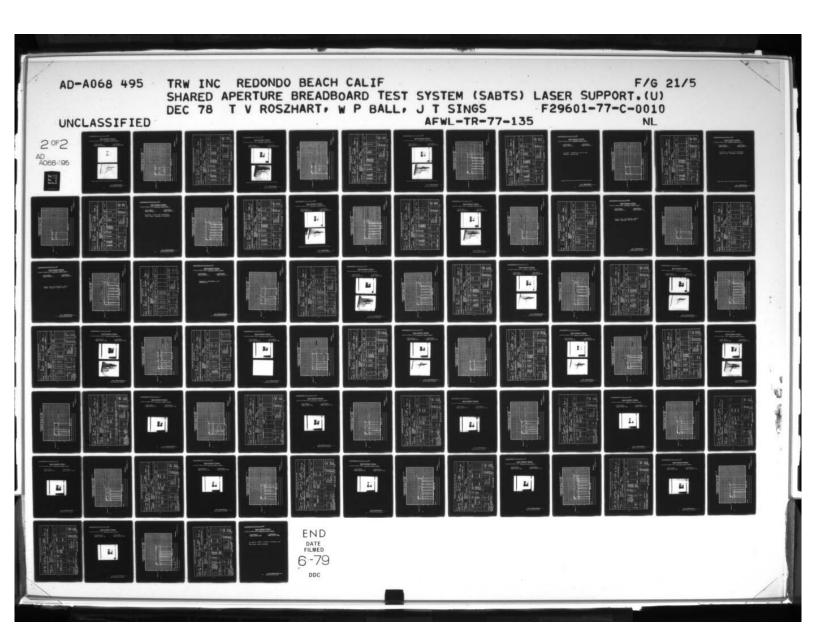
LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-258 **ESTIMATED POWER VS. TIME**



		LANNE		QUICK LOOK TEST DATA	TEST DATA				
812-17A.		PLAN SABTS		DATE 1-26	-77	11ME 1/8	1840		
D2 FIRE VALVE OPEN (SEC) 10. 4		D2 FIRE VALVE CLOSED (SEC) 46. 8		LASING DURATION (SEC)	36.4	TOTAL COMPLETED TEST POSITIONS	WETED 6	PLANNED TOTAL PWR.	PWR. 59
PLANNED TEST NO. CE-10	T NO.C		TIME LINES		AS OF	DATE	1-24-1	DATE /- 24-77REVISION OR16	OR16
EXPERIMENTER D. MULLEN	EN	PLANNED LINEAR MAGNIFICATION PLANNED FEAK	1201	N 2.2	CONFIGURATION M. REFLEC TRANS	JRATION MEFLECTIVE TRANSMISSIVE	,		
		PLANNED				ACTUAL	IJAL		
TEST SPECIMEN POSITION NO.	COATING		TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
(3)	HUGHES DOF DOF		01.1	14.00	14.4	19.5	28	9.	
553	170 000 170 170	40	1.10 1.10	2440 3440 3950		18.8		1.6	
					46.3		56.5		
ITEM		START (SEC)	12	STOP (SEC)		ITEM		START (SEC)	STOP (SFC)
TV CAMERA No. No. No.	No. 1 No. 3 No. 4	NO			O-GRAPII SANGAMO No. SANGAMO No. SABIS SEQ.	0 No. 1		MAN. 6.0 4.0	MAN 49.0 43.5
FLOW SOLENOID	CHOID	0.01	4	47.0	CALORIME	CALORIMETER (SANTS) CALORIMETER (SLOW SHUTTER)	UTTER	7.0.E	44.0

ŏ

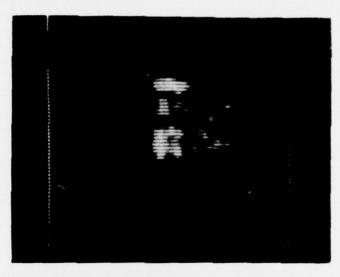
REF. 1CR M. 21363

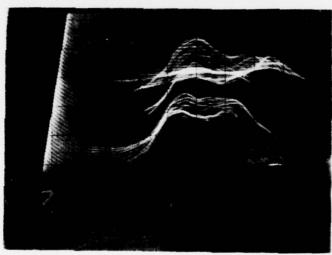


AS SEEN BY IR CAMERA VIEWING SECUND TURN FLAT

APPROX. TIME (SEC) ZO

APPROX. TIME (SEC) ZO

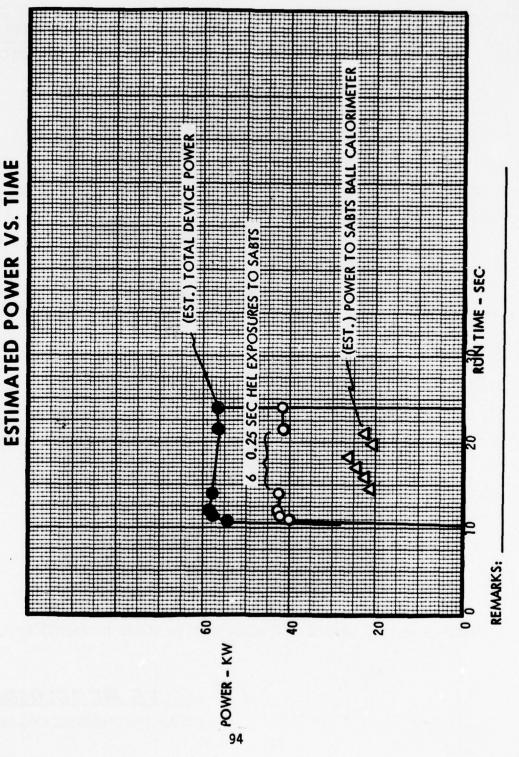




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-259



					COUNTY TOOL AND TOOL	200				
RUN NO.	VII - 259	PLAN PLAN	SABTS		DATE 1-2"	1-27-17	TIME 20	2039		
D2 FIRE VALVE OPEN (SEC)	ME 10.4		D2 FIRE VALVE CLOSED (SEC) 2	24.2	LASING DURATION (SEC)	13.8	TOTAL COMPLETED TEST POSITIONS	ONS 6		PLANNED TOTAL PWR.
PLANNED	VED TEST	Ö	CE-3 TIME	TIME LINES		AS OF	DAT	E1-24-T	7 REVISI	DATE 1-24-77 REVISION ORIG
EXPERIMENTER	TER		PLANNED LI	INEAR		CONFIGURATION	JEATION MEET CTIVE			
0	MULLEN	ν.	PLANNED P	EAK 17.6 1	PLANNED PEAK / 7.6 KW/CM2		TRANSMISSIVE			
			PLANNED				ACTUAL	UAL		
TEST	SPECIMEN NO.	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	ME TIME FROM	TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-	AI	HVGHES	.25	1.10	14.00	14.4	21.2	58.5	1.6	
2		DOF	. 25	011	/5.35		22.4		*	
e •	H3	100	163	0//	18.05		264			
	T	1700	.25	1.10	10.40		20.4		-	
		P.E	.25		20.75		422		1.6	
					21.00	23.6		57.5		
	ITEM		START (SEC)		STOP (SEC)		ITEM		START (SEC)	STOP (SFC)
2	TV CAMERA No.	-	NO			O-GRAPH			MAN	MAN.
	No. 2	2	"			SANGAMO No.	O No. 1		6.0	28.0
	2		2	+		SANGAMO No.	0 No. 2		Z	21.0
	Š	+	5	+		CALORIME	CALORIMETER (SABTS)	1	4.0	21.0
	SABTS INST.					CALORIM	CALORIMETER (SLOW SHUTTER)		0.0	14.0
HI FLOW	S	CIONSI	10.0	2	24.5	*	1	,	0.13	24.5

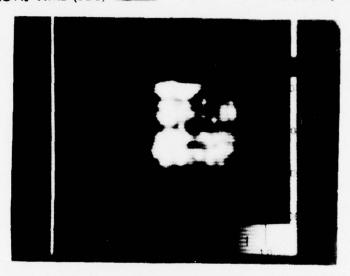
LASER PERFORMANCE ANALYSIS, RUN VL 1-259

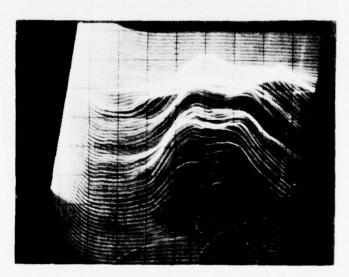
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURIN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20

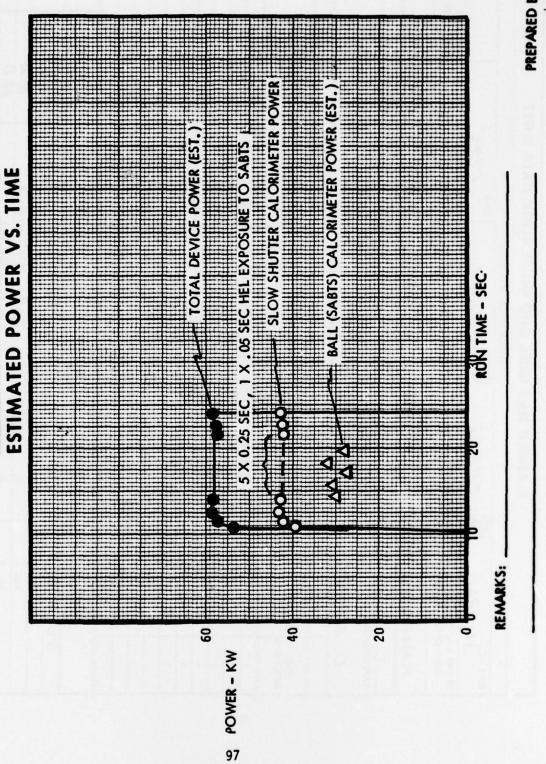




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-260



J. SINGS

-										_
NON NO	092-17A	PRAN	IN SABTS		DATE 1-27-77	77	TIME / 9	5461		
D2 FIRE VALVE OPEN (SEC)	EC 10.4		D2 FIRE VALVE CLOSED (SEC) 2	24.2	DURATION (SEC) / 3. B	13.8	TOTAL COMPLETED TEST POSITIONS	AMETED 6	PLANNED TOTAL PWR.	WR. 57
PLAN	PLANNED TEST	ST NO. C.E-6		TIME LINES		AS OF	DAT	11-12-13	DATE /-27-77 REVISION	A
EXPERIMENTER	ITER		PLANNED LINEAR MAGNIFICATION	NEAR 2.7		CONFIGURATION	MATION			
D.	MULLEN	1/3	PLANNED PEAK PWR DENSITY	28	KW/CMª	20	TRANSMISSIVE			
			PLANNED				ACT	ACTUAL		
TEST	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	F TIME FROM	TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOI DIAMETER	COMMENTS
-	81	PE	.25	1.10	14.00	14.4	30.0	58.0	1.3	
2	BC	DOF	.25	01.1	15.35		30.4			
3	B 3	DOF	.25	1.10	16.70		27.2			
-	84	ממו	.25	01.1	19.05		32.0			
5	BS	סמו	52.	1.10	17.40		28.0		-	
9	98	PLEXI	50'		20.80				<i>E.1</i>	
	ITEM		START (SEC)	İš	STOP (SEC)		ITEM	-	START (SEC)	STOP (SEC)
2	TV CAMERA No.		NO			O-GRAPH			MAN	MAN
	2	6.3	=			SANGAMO No.	e.		6.0	28.0
	ż	0, 3	1,			SANGAMO No.	0 No. 2		N/A	
	Š	9. 4	"			SABTS SEQ.	نہ		14.0	21.0
						CALORIM	CALORIMETER (SABTS)		14.0	21.0
- 1	SABIS INST.					CALORIM	CALORIMETER (SLOW SHUTTER)	UTTER	10.0	14.0
HI FLI	FLOW SOLEWID	CNND	10.0	2	24.5	2	2	"	8.02	24.5

LASER PERFORMANCE ANALYSIS, RUN VL1-260

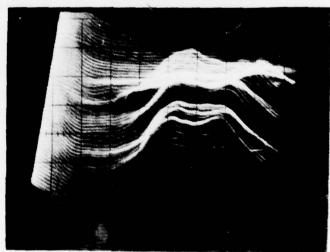
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) ZO

APPROX. TIME (SEC) ZO

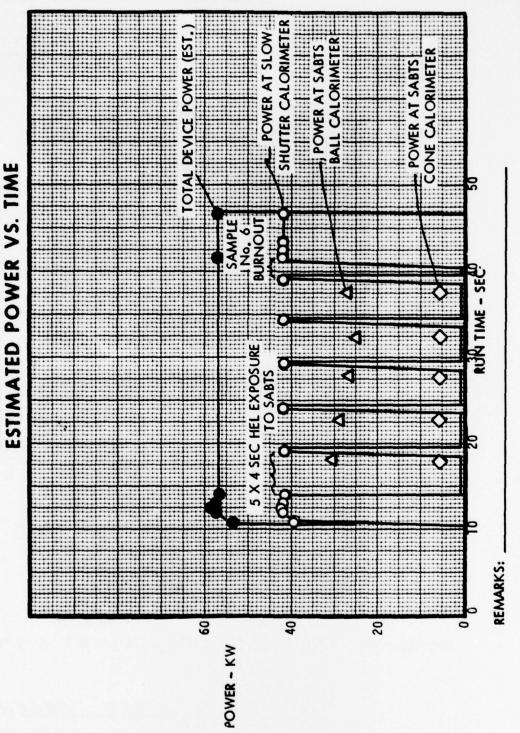




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-261



100

				QUICK LOOK TEST DATA	TEST DATA				
NUN NO. 11-261	PAN PAN	SABTS		DATE 1-28	-28-77	11WE 20	2056		
DE FIRE VALVE 10. 4	D2 FIRE VALVE CLOSED (SEC)	1	46.7	LASING DURATION (SEC)	36.3	TOTAL COMPLETED TEST POSITIONS	METED 6	PLANNED TOTAL PMR.	Mr. 5.9
PLANNED TEST NO. $CE extstyle{-}//$.CE-1/		TIME LINES		AS OF	DATE	1-57-1	DATE /- 24-77REVISION	ORIG
EXFERMENTER		MANNED LINEAR	NEAR 2.7		CONFIGURATION	MATION BEFERECTIVE			
D. MULLEN		PLANNED PEAK	42	KW/CM*		TRANSMISSIVE			
		PLANNED				ACTUAL	IM		
TEST SPECIMEN COAPOSITION NO. DESI	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	E TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
I PE	+	4.0	1.10	14.00	18.0		58	1.3	
		4.0	1.10	19.10		28.8		4	
		4.0	1.10	24.20		26.7			
		4.0	1.10	29.30		24.9			
		4.0	1.10	34.40		27.0		1.3	
SHOULE ST	HES	4.0		43.50					
							57.6		
ITEM		START (SEC)	15	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
TV CAMERA 140. 1	+	NO			O-GEAPH		-	MAN	MAN
No. 2	-	=			SANGAMO No.	O No. 1		6.0	064
P. 3		•			SANGAMO No.	O No. 2		N/A	
140. 4		5			CALORIMET	SABIS SEQ.	+	14.0	43.5
SABIS INST.	+		-		CALORIM	CALORIMETER (SLOW SHUTTER)	NUTTER	10.01	14.0
FLOW SOLEMOID	6	10.0	47.0	0.				43.5	47.0

LASER PERFORMANCE ANALYSIS, RUN VLI-261.

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

TOTAL INTENSITY LINEAR PROFILE*

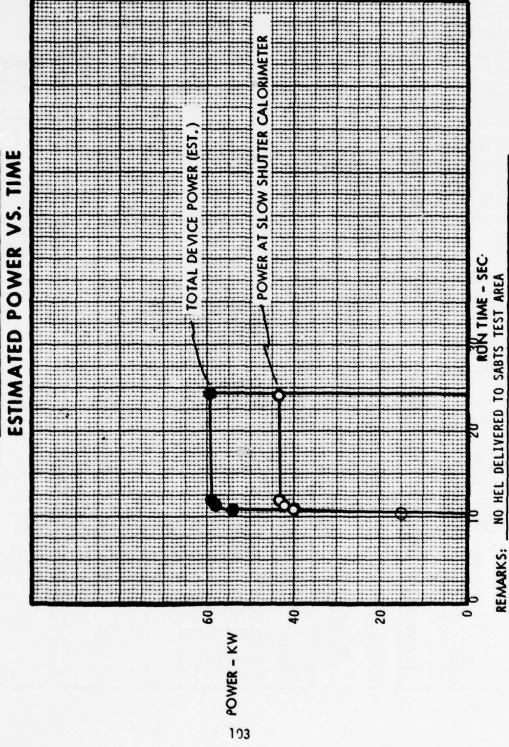
APPROX. TIME (SEC) _____ APPROX. TIME (SEC) _____

NO DATA - OPERATING SWITCH NOT TURNED ON AFTER EM.

*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSAN





PREPARED BY:

FLANNED TEST NO. CF. B TIME LINE TIME TO ALL TOTAL COMMETTED TOTAL COMMETTED	N NO.					QUICK LOOK TEST DATA	TEST DATA				
10 4		1-26		1 .		ATE 1-28-	.77		3/		
D TEST NO. CE-B TIME LINEAR AS OF DATE 1-28-77REVISION OR	FIRE VALVE OPEN (SEC)			1	3	ASING URATION (SEC)	,	TOTAL CON TEST POSITION			1
CONTICUENT PLANNED LINEAR 3.5 CONTICUENTON MAGNIFICATION MAGNIFICA	PLANNE	D TEST			LINES	`	NS OF	DATE	1-28-1	7REVISIO	
SPECIMEN PLANNED FRAK SPECIME PLANNED FRAK SPECIME PLANNED FRAK SPECIME PLANNED FRAK SPECIME PLANNED FRAK FRIMENTE			PLANNED LI	# Z		CONFIGURATI	NO N				
SPECIMEN COATING EXPOSLURE TOANSISTIME TOANSISTI		VILE	>	PLANNED PE	J.	W/CM²		ANISMISSIVE			
SPECIMEN COATING EXPOSIME TIME FROM TIME EST, PWR. TOTAL SPOTE DIAMETER			PLANNED				ACT	JAL			
B		ECIMEN NO.	COATING		TRANSIT TIMI (POST EXPOSURE)		TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOI DIAMETER	COMMENTS
B2 D0F .25 1.0 16.70 18.05 1.0 16.70 18.05 1.0 16.70 18.05 1.0 17.40 17.40 1.0 17.40 1.0 17.40 1.0 17.40 1.0 17.40 1.0	-	3/	PE	52.	1.10	14.00			59.2		
B3 DOF .25 10 18.05			DOF	.25	1.10	/5.35					
B4 DILI .25 1.10 19.05 18.	+	1	DOF	.25	1.10	11.70					
BL PLEXI	\dagger	+	מנון	-55	0/1/	/8.05					
NITTE: SLOW	+	1	PLEXI	 		20.75					
ITEM START (SEC) STOP (SEC) ITEM START (SEC) TV CAMERA NO. 1 DN III No. 3 II SANIGAMO NO. 2 III No. 3 II SANIGAMO NO. 2 III No. 3 II SANIGAMO NO. 2 III No. 4 II SANIGAMO NO. 2 III SANIGAMO NO. 2 III SANIS INST. CALORIMETER (SANTS) III FIGUR SOLEMBID 18.0 29.5 III III III FIGUR SOLEMBID 18.0 29.5 III FIGUR SOLEMBID 19.0 29.5 29.5 29.5 29.5 FIGUR SOLEMBID 19.0 29.5		+				70.86			59.6		
ITEM START (SEC) STOP (SEC) ITEM START (SEC)	#	VIO TE	SHOW	ATT WILL	MULPI		1		11	7	1 1
TV CAMERA No. 1		ITEM		START (SEC)	ste	OP (SEC)		ITEM		START (SEC)	STOP (SEC)
No. 2	N CA	MERA NO.	-	NO			O-GRAPH			NAN.	MAN
No. 3 11 SANGAMO No. 2 N/A No. 4 11 SABIS SEQ. 14.0 SABIS INST. CALORIMETER (SABIS) 14.0 FIGUR SOLEMBID 18.0 24.5 11 11 11 20.86		No.	1	1			SANGAM	0 No. 1		6.0	28.0
SABTS INST. 14. D CALORIMETER (SABTS) 14. D CALORIMETER (SLOW SHUTTER) 16. D CALORIMETER (SLOW SHUTTER) 17. D CALORIMETER (SLOW SHUTTER) 17. D CALORIMETER (SLOW SHUTTER) 17. D		2	3	"			SANGAM	O No. 2		NIA	-
SABTS INST. SABTS INST. CALORIMETER (SLOW SHUTTER) 19, 0 1 FIGU SOLEMUID 10,0 24,5 11 11 20,86		2	4	"			SABTS SEC	ن		14.0	20.86
FIGW SOLEMOD 10.0 24.5 11 11 20.86							CALORIM	ETER (SABTS)		4.0	20.86
		W SO.	CION3)	0.01	24	5	CALORIM	ren (stow se	()	20.86	24.5

LASER PERFORMANCE ANALYSIS, RUN VL1-262

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

TOTAL INTENSITY LINEAR PROFILE*

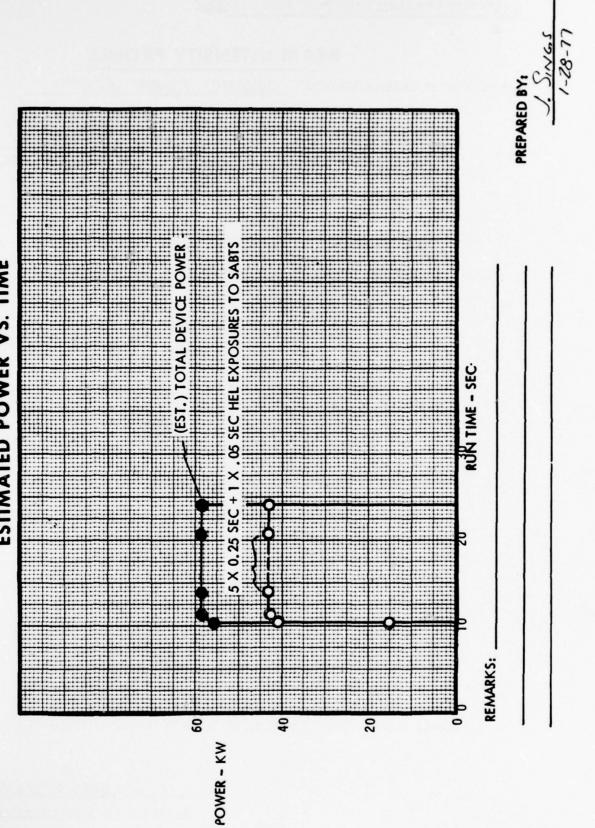
APPROX. TIME (SEC) _____ APPROX. TIME (SEC) _____

NO DATA - COULD NOT RETRIEVE DATA FROM SANGAMO RECORDER

*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-263 **ESTIMATED POWER VS. TIME**



D TEST NO. CE-E OULLEN COMEN P 24.	DATE 1-28 LASING DURATION (SEC 3.5 TIME TIME FROM 1,6.70 1,5.35	13. 13. OF S OF	M 1572	1839 COMPLETED	PLANNED		
NNED TEST NO. C.F. E. CLOSED NO. C.F. E. CLOSED NO. C.F. E. C. COATING NO. C.	TANK TANK TANK TANK TANK TANK TANK TANK	J. 5 3. 5 TIME TIME FROM (SEC) 1. 6.00 1. 6.00	13.4 S OF	55	METED		ien
D TEST NO.CE.E	E LIS	3.5 KW/CM ² TIME FROM I TIME FROM (*.00	9 9		cho		PWR. 579
CIMEN COATING DESIGN	TEAK ATION	1/2MF	ONFIGURATION DE CENTRE DE TRA	3	1-88-1	DATE 1-28-77REVISION	N 0R16
SPECIMEN COATING DESIGN	¥¥		2	MEFLECTIVE			36
SPECIMEN COATING DESIGN				☐ TRANSMISSIVE			
SPECIMEN COATING NO. DESIGN				ACTUAL	JAL		
	111 52 25 1.11	0 15.35	TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
H	7// 52	7 75.35	14.4	25.2	59.4	1.0	
DOF				27.6		4	
DOF	011 52	16.70		25.2		•	
+	52 110	19.40		26.4	-	9	
BE PLEXI	11 11	20.75		1.61			
		70.86			2.65		
ITEM STAR	TART (SEC)	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
TV CAMERA NO. 1	>		O-GRAPH			MAN.	MW
No. 2			SANGAMO No. 1	No. 1		6.0	28.0
No. 3			SANGAMO No.	No. 2		N/A	
76. 4			SABTS SEQ.	70 /c v 076	1	0.4	20.86
SABTS INST.			CALORIME	CALORIMETER (SLOW SHUTTER)	UTTER	10.0	14.0
HI FIGW COLEMBID 18.0	2	24.5	=	:		20.86	24.5

LASER PERFORMANCE ANALYSIS, RUN VL1-263

BEAM INTENSITY PROFILE

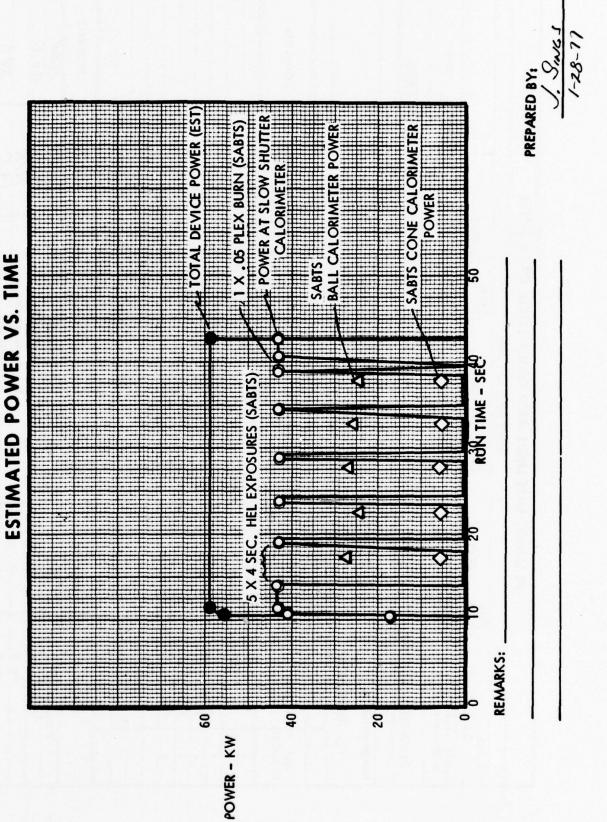
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

TOTAL INTENSITY	LINEAR PROFILE*
APPROX. TIME (SEC)	APPROX. TIME (SEC)

NO DATA - COULD NOT RETRIEVE DATA FROM SANGAMO RECORDER

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-264



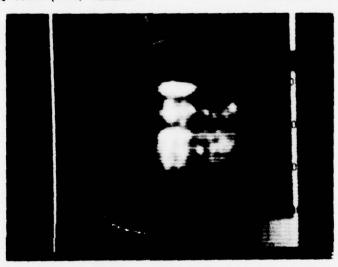
RUN NO.				-						
7	111-264	PAN PAN	N SABTS		DATE 1-28-	1-77	TIME	2007		
D2 FIRE VALVE OPEN (SEC)	EC) 10.4		D2 FIRE VALVE CLOSED (SEC) 4.	42.7	LASING DURATION (SEC)	32.3	TOTAL COMPLETED TEST POSITIONS	WALETED A	PLANNED TOTAL PWR.	PWR. 59
PLAN	NED TES	PLANNED TEST NO. [E-12		TIME LINES		AS OF	DAT	E /-88-7	DATE /-28-77REVISION	N OR16
EXPERIMENTER	ITER		PLANNED LINEAR		3.5	CONFIGURATION	MATION			
Ö	MULLEN	~	PLANNED PEAK PWR DENSITY	ARE AR	38 KW/CMZ		TRANSMISSIVE			
			PLANNED				ACT	ACTUAL		
TEST	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	AE TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-	18	3d	4.0	1.10	14.00	17.6	27.1	1.65	0.7	
2	A2	DOF	4.0	91'1	19.10		24.7		4	
0	A3	DOF	4.0	1.10	24.20		8.92			
-	A4	סכרו	4.0	1.10	24.30		25.8			
5	415	1710	4.0	1.10	30.40		24.6		1.0	
•					39.61			59.2		
	ITEM .		START (SEC)	S	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
7	TV CAMERA No. 1	-	NO			O-GRAPH			MAN.	MAN
	2	No. 2	1			SANGAMO No.	- °N C		6.0	45.0
	Ž	%. 3	"			SANGAMO No.	O No. 2		NIA	
	.og	. 4	"			SABTS SEQ.	نے		14.0	39.6
						CALORIM	CALORIMETER (SABTS)		14.0	39.6
ZVI	SABTS INST.			-		CALORIM	CALORIMETER (SLOW SHUTTER)	HUTTER	10.0	14.0
HI FLL	FLOW SOLENOID	CNOID	10.0	43	43.0	=	=	2	39.6	43.0

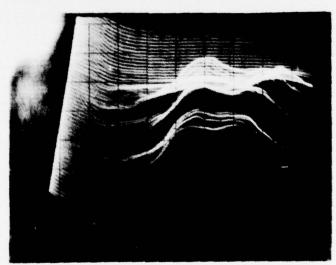
LASER PERFORMANCE ANALYSIS, RUN VL 1-264

BEAM INTENSITY PROFILE

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20

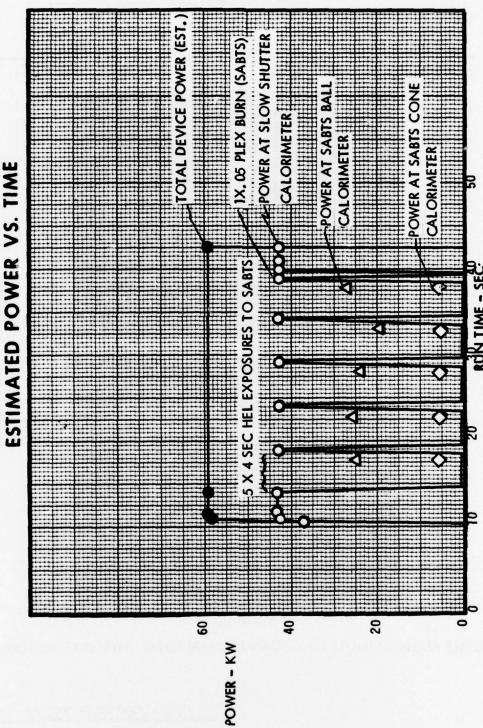




*PROFILE ALONG SINGLE LINE SCAN SEEN IN TOTAL INTENSITY PICTURE.

LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-265



PREPARED BY:

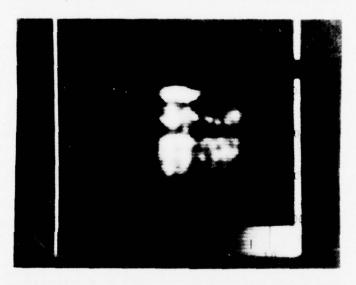
REMARKS:

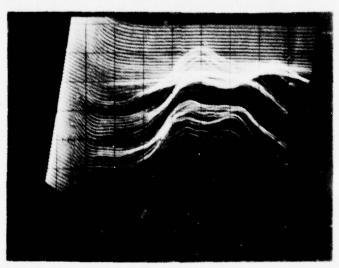
					OUCK L	QUICK LOOK IEST DATA	DATA					
RUN NO.	111-265	FLAN 2	N SARTS	5.	DATE /-	1-28-77	1.1	TIME 21	2145			
D2 FIRE VALVE OPEN (SEC)	SEC) 10.4		D2 FIRE VALVE CLOSED (SEC) 4	42.5	LASING DURATION (SEC)	1	32.1	TOTAL COMPLETED TEST POSITIONS	APLETED 6		PLANNED TOTAL PWR. 59	6
PLAN	PLANNED TEST	T NO. C.	NO. C.E 13 TIME LINES	LINES		AS OF	D.	DAT	DATE /-28-77 REVISION	7 REVIS	ION DRIG	0
EXPERIMENTER	LTER		PLANNED L		3.5	CON	CONFIGURATION	MATION Marriective				
O	MULLEN	*	PLANNED PEAK 3	EYK 38	38 KWICM?	~	7	TRANSMISSIVE				
			PLANNED					ACTUAL	UAL			
TEST	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	IME TIME FROM		TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER		COMMENTS
-	5	PE	4.0	1.10	19.60	1 09	1.9	24.8	59.3	0.1		
2	C2	DOF	4.0	1.10	19.10	0,		25.9		1		
3	(3	DOF	4.0	1.10	24.70	2		23.6				
•	29	סנו	9.0	1.10	Z	20		14.5				
\$	2	0111	4.0	1:10	24.			777		0.7		
	١٥	LIEAL			1 1 1 1 1 1 1 1 1 1	19			59.1			
	ITEM		START (SEC)		STOP (SEC)	+		IEA		START (SEC)		STOP (SEC)
2	TV CAMERA No.		NO	-		°	O-GRAPH			MAN	I	MWN
	No. 2	. 2				13	SANGAMO No.	- · · ·		6.0	7	450
	No. 3	. 3	u			Š	SANGAMO NO.	No. 2		KID		
	2 6.	•	,			1313	SABTS SEQ.	SABTS SEQ. CALORIMETER (SABTS)		0.4	N M	39.6
SA	1			-		3	ALORIME	CALORIMETER (SLOW SHUTTER)	(UTTER)	10.01	7	14.0
HI FU	FLOW SOLL	CONEMBIO	10.0	4	43.0		=		=	39.6	4	3.0

AS SEEN BY IR CAMERA VIEWING SELOND TURN FLAT

APPROX. TIME (SEC) 20

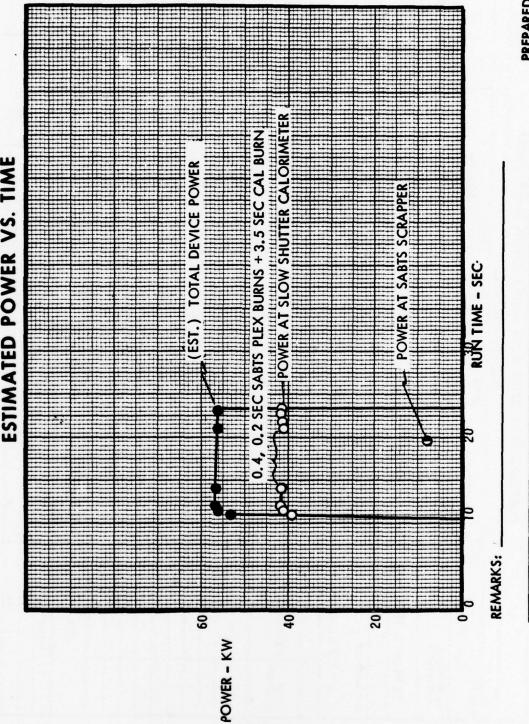
APPROX. TIME (SEC) 20





LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-266 **ESTIMATED POWER VS. TIME**



PREPARED BY:

NAME PATE 2 - 8 - 77 NAME PATE 2 - 8 - 77 NAME PATE PA			PLANNE	D TIME LI	PLANNED TIME LINES AND QUICK LOOK DATA SHEET QUICK LOOK TEST DATA	QUICK LC	DOK DAT	A SHEET		
TIME LINES	244 PLAN		-		DATE 2 - B.	.77	TIME	0 34		
TIME LINES AS OF DATE ? 7 / REVISION / 17 / LANNED LINEAR CONFIGURATION LANNED FAX LO KW/L/M ** LINEAR FROM TIME EST. PWB. TOTAL SFOIL LO ST. L L L	10. 4 CLOSED (5		EC) 2	3.2	ASING JURATION (SEC	1	TOTAL COA		TOT	
CONFIGURATION ACTUAL ACT	PLANNED TEST NO. R		R.5 TIME	LINES		AS OF	DAT	2.7.	REVISIO	- 11
C O N V C O C C C C C C C C			PLANNED L	MEAR		CONFIGURATI	ION			
ACTUAL ACTUAL SPOT SPO	MULLIEN		PLANNED P	0/ 4	WICME		ANSMISSIVE			
TRANSIT TIME FROM TIME EST. PWR. TOTAL SPOT SPOT			PLANNED				ACT	IVI		
4 C	SPECIMEN COATING NO.		EXPOSURE TIME (SEC)	TRANSIT TIM (POST EXPOSURE)		TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
0.4 1.10 14.0	CONE CAL	11	40		0:01	73.2		57.6		
7.5 1.10 154 154 155	PLEXI 1		4.0	01.1	14.0					
3.5	PLEXI 2	1	0.2	01.1	15.4					
1 0	TIL MBS CUT	-11			14.8					•
AMT (SEC) STOP (SEC) STAPT (SEC)	CONF CAL		OE		20.5					
TANT (SEC) STOP (SEC) STANT (SEC) ST					233	26.7		57.7		
ANT (SEC) STOP (SEC) ITEM START (SEC)										
O-GRAPH MANT SANGAMO No. 1 L U SANGAMO No. 2 N/A SANGAMO No. 2 N/A SANGAMO No. 3 L U SANGAMO No. 3 L S CALORIMETER (SLOW SHUTTER) 10. L S CALORIMETER (SLOW SHUTTER) 10. L S CALORIMETER (STOW S		11	START (SEC)	15	OF (SEC)		ITEM		START (SEC)	STOP (SEC)
SANGAMO No. 1 L. U. SANIGAMO No. 2 NV. M SANIGAMO No. 2 I. U. CALORIMETER (SANIS) 1. L. S CALORIMETER (SLOW SHUTTER) 1.0. U. 27.3 1 10. U.	TV CAMERA No. 1	H	No			O-GRAPH			KAK	MAN
SANGAMO No. 2 NV. A SABIS SEQ. CALORIMETER (SABTS) 1.2. 8 CALORIMETER (SLOW SHUTTER) 1.2. 6 CALORIMETER (SLOW SHUTTER) 1.2. 6 23.3	No. 2	1	"			SANGAM	O No. 1		10	26.0
CALORIMETER (\$LOW SHUTTER) 12.67 23.3 4 4 4 6 23.3	No. 3		*			SANGAM			NIA	
CALORIMETER (SLOW SHUTTER) 10.17 2.7.3 1 4 4 6 2.9.3	₹.		"	1		SABTS SEC	-	+	- 1	2.16
23.3 4 4 6 29.3						CALORIM	ETER (SLOW SP		10.01	14.0
	TION SHENDID	1 1	10.01	2	1.3	"	1		660	1.62
								200	1	

LASER PERFORMANCE ANALYSIS, RUN VL 1-266

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SIECOND TURN IFLAT

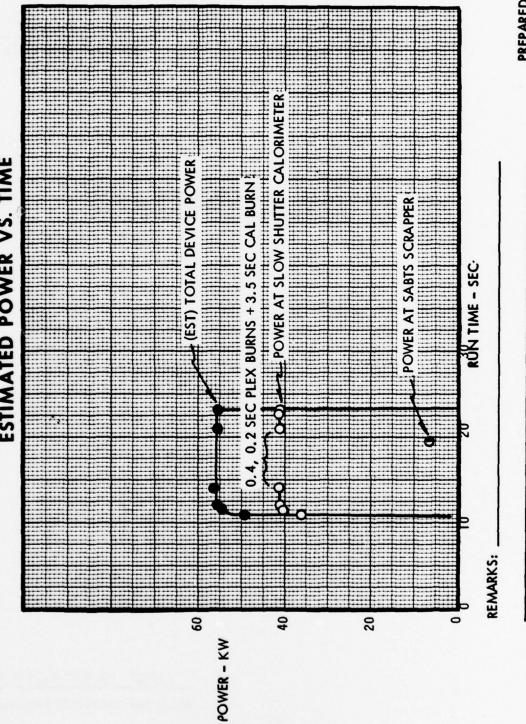
APPROX. TIME (SEC)

APPROX. TIME (SEC)

COULD NOT RETRIEVE DATA

LIEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-267
ESTIMATED POWER VS. TIME



PREPARED BY,

FEST NO. RL TIME LINES TIME TOTAL COMPLETED TOTAL COMPLE	10.4	-					ONCK 10	QUICK LOOK TEST DATA					
10, 4	10.4	5 NO.				14	N	~		338			
The control of the	D TEST NO. RL TIME LINEAR CONFIGUATION CONFIGUATION CONFIGUATION CONFIGURATION C	PRE VA			(SEC)	Cri	LASING DURATION (S		TOTAL CO TEST POSIT				6-2
COATING PLANNED INEAR CONFIGURATION CONFIGURATION COATING CASTING CASTIN	CONTING PLANNED LINEAR CONTING	PLAN	INED TES	Ö		E LINES		AS OF	DAI	2.7.	- 11		3
PANNED FEAK 45 KW/LM2 CALCAIN PHANNED FEAK 45 KW/LM2 CALCAINE CALCA	SPECIMEN PLANNED FEAK 45 KW/LAT DITANSMISSIVE	KPERIMEN	715		PLANNED	ATION		CONFIGURA	TION				
SPECIMEN COMEN OF TABLE IN TA	SPECIMEN COATING EXPOSIME TRANSIT TIME TIME FROM TIME EST. PME, TOTAL SPOT		WILLE	N	PLANNED	¥			RANSMISSIVE				
SPECIMEN COATING EXPOSLUE TRANSIT TIME FROM TIME EST. PWE. TOTAL SPOT	SPECIMEN COATING EXPOSLUE FACTOR TIME EST. PWR. TOTAL SPOT SOUTH S				PLANNED				AC	TUAL			
CONF. LAL. 4.0 10.0 14.0 57.5 PLEXI 0.4 1.10 14.0 57.5 PLEXI 2 0.2 1.10 14.0 57.5 TOT ABS CR. 3 3 1.10 14.0 57.5 LOWE LAL 3 3 20 20 3 20.3 LOWE LAL 3 3 20 20.3 20.3 LOWE LAL 3 3 20 57.5 TO CAMERA No. 1 57.5 No. 2 11 54NGAMO No. 1 54NGAMO No. 1 SANGAMO No. 2 11 54NGAMO No. 1 SANGAMO No. 3 4 11 54NGAMO No. 2 54NGAMO No. 1 SANGAMO No. 3 4 54NGAMO No. 2 54NGAMO No. 1 CALORIMETER (SANTS) CALORIMETER (SANTS) 54NGAMO SANTIFER) 54NGAMO SANTIFER) 54NGAMO SANTIFER (SANTS) 54NGAMO SANTIFER) 54NGAMO SANTIFER (SANTS) 54NGAMO SANTIFE		SITION		COATING					EST. PWR. AT TARGET		SPOI		MENTS
PLIXI D.4 1.10 14.0	PLEXI O.4 1.10 14.0 14.0 14.0 14.0 15.5 1.10 15.5 1.10 15.5 1.10 15.5 1.10 15.5 1.10 15.5 1.10 15.5 1.10 15.5 1.10 15.5 1.10	-		LEWE LAL	-		100	\vdash		57.5			
PLEX. 2 D.2 1.10 155 107 ABS CAL 3 5 1.40 155 107 ABS CAL 3 5 1.40 155 116M	PLEXI & D.2 1.10 15 5 1	7		PUCK! 1	4.0	1.10	14.0						
TOT ABS LAL 3.5	TOT ABS CM 3 5	3		PLEXI E		1.10	15.5						
COWE LAL 3.0	CAME LAL 3.0 20.5 22.7 57.5	-		TOT ABS C			16.8						
TEM START (SEC) STOP (SEC) START START SEC) STOP (SEC)	TY CAMERA No. 1 D/N O-GRAPH TANN No. 2 1/1 SANIGAMO No. 1 E.J. 0 SANIGAMO No. 2 1/1 SANIGAMO No. 2 1/2 SANIGAMO No. 3 1/2 1/	2		COME LA			20.5						
START (SEC) STOP (SEC) (TEM D. 1 D. 1 SANGAMO No. 1 SANGAMO No. 2 SANGAMO No. 2 SANGAMO No. 2 SANGAMO No. 3 SANGAMO No. 4 // SANGAMO No. 2 SANGAMO No. 3 SANGAMO No. 2 SANGAMO No. 3 SANGAMO No. 4 // SANGAMO No. 2 SANGAMO No. 2 SANGAMO No. 3 SANGAMO No. 4 //	ITEM START (SEC) STOP (SEC) ITEM START (SEC) TV CAMEIA No. 1 OGIAPH AWAYA No. 2 II SANGAMO No. 2 AWAYA No. 4 II SANGAMO No. 2 AWAYA No. 4 II SANGAMO No. 2 AWAYA SANTS INST. CALORIMETER (SANTS) A. I.	9					23.3	22.7		57.5			
No. 1	ITEM START (SEC) STOP (SEC) ITEM START (SEC) TV CAMERA No. 1 1/1 SANGAMO No. 1 1/2.0 No. 3 1/1 SANGAMO No. 2 1/2.0 SANTS INST. CALORIMETER (SANTS) 1/2.0 SANTS INST. CALORIMETER (SANTS) 1/2.0 CALORIMETER (
No. 1	ITEM START (SEC) STOP (SEC) ITEM START (SEC)												
No. 1 ON O-GRAPH No. 2 II SANGAMO No. 1 SANGAMO No. 1 SANGAMO No. 2 SANGAMO No. 2 SANGAMO No. 2 SANGAMO No. 2 CALORIMETER (SABTS) CALORIMETER (SLOW SHUTTER)	TV CAMERA No. 1		ITEM		START (SEC)		TOP (SEC)		ITEM		START (SE		OP (SEC
No. 3 // SANGAMO No. 1 No. 4 // SANGAMO No. 2 No. 4 // SANGAMO No. 3 No. 4 // CALORIMETER (SANTS) CALORIMETER (SLOW SHUTTER) CALORIMETER (SLOW SHUTTER)	No. 2 11 SANGAMO No. 1 LJ. 0 No. 3 4 11 SANIS AMOUND. 2 AVIII No. 4 11 SANIS SEQ. AVIII SANIS INST. CALORIMETER (SANIS) 16. K° CALORIMETER (SLOW SHUTTER) 10. 0 1. 1. 0 2.3. 3	2	CAMERA No	1.	NO			O-GRAP	Į		NAN	The state of the s	NY
No. 4 1/ SABIS SEQ. CALORIMETER (SABIS) CALORIMETER (SABIS)	No. 3 # SANGAMO No. 2 N//II No. 4 !! \$AAPIS SEQ. E. K. SANTS INST. CALORIMETER (SANTS) E. K. * F.C. W. SULFAUTER E. C. E. K. * F.C. W. SULFAUTER E. C. E. C.		Ž		11			SANGA	MO No. 1		0.0	157	6.0
No. 4 // SABIS SEQ. CALORIMETER (SABIS) CALORIMETER (SABIS) CALORIMETER (SLOW SHUTTER)	SABIS 1NST. SABIS 1NST. CALORIMETER (SABIS) (A. B. CALORIMETER (SABIS) (A. B. CALORIMETER (SLABIS) (A. B. CALORIMETER (SLABIS) (A. B. CALORIMETER (SABIS)		Ž	0.3	*			SANGA			NIA		
CALORIMETER (SABTS) CALORIMETER (SLOW SHUTTER)	SABTS INST. SABTS INST. CALORIMETER (SLOW SHUTTER) 10.0 23.3 CALORIMETER (SLOW SHUTTER) 12.0 23.3		Ž	0. 4	"			S STANS	Ġ.				
CALORIMETER (SLOW SHUTTER)	SANTS INST. CALORIMETER (SLOW SHUTTER) 10.00 10.							CALORIA	WETER (SABTS)		16.5%	7	7.3
	12.2 W SULMENT 100 23.4 " " 1 20.3	SAI	-					CALORIA	AETER (SLOW S	HUTTER	10.01	11	0.1
I TOWN SULPHIND ID 0				CHENE	001		23.3			•	20.3	7	1 5

LASER PERFORMANCE ANALYSIS, RUN VL1 - ZG7

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SELDND TURN FLAT

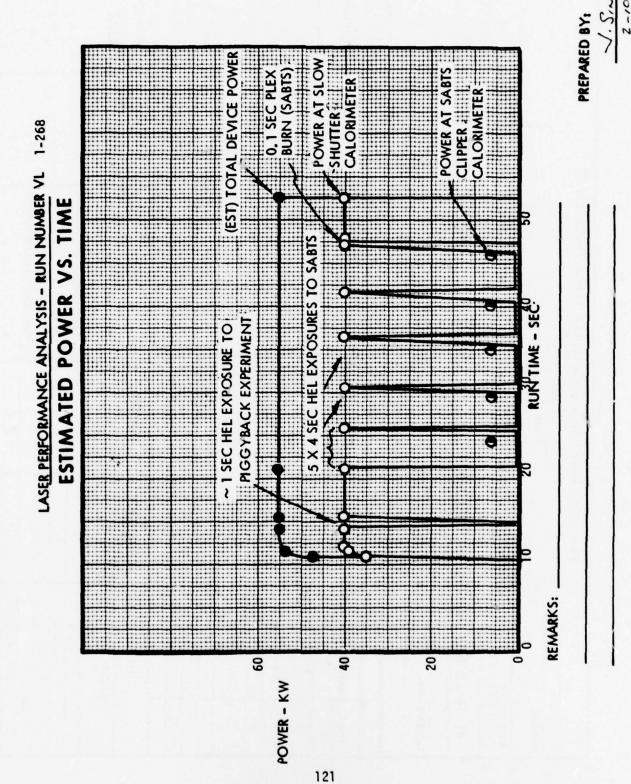
TOTAL INTENSITY

LINEAR PROFILE*

APPROX. TIME (SEC) _____

COULD NOT RETRIEVE DATA

LEE BERGERSON



			PLANN	ED IIME	LINES A	OUCK LOOK TEST DATA	JONTA LC	PLANNED TIME LINES AND GOICE LOOK DATA SHEET	A SHEET			
RUN NO.	277-17		PLAN SARTS	1	DATE 2	-6-2	77	TIME 2	2111			
D2 FIRE VALVE OPEN (SEC)	SEC) 10		D2 FIRE VALVE CLOSED (SEC)	52.4	LASING DURATION (SEC)	4 (SEC) 4	42.0	TOTAL COMPLETED TEST POSITIONS	ONS 7		PLANNED TOTAL PWR.	6.5
PLAN	PLANNED TEST NO.0574.70	T NO.OF	76 / UAI TIM	A TIME LINES		AS	ō	DATE	5.2	77 REVISION		7
EXPENIMENTER L' I'N	INULLEN	EN	PLANNED LINEAR MAGNIFICATION PLANNED FEAK	CATION PEAK	1.7		CONFIGURATION KELEC	URATION ER REFLECTIVE				
			PLANNED			-		ACI	ACTUAL			
TEST POSITION	SPECIMEN NO.	COATING	-	TRANSIT TIME (POST EXPOSURE)		TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	55	COMMENIS
	1.1.7	1X_11d	1.0	15.7	14.	14.00						
-	X	14	4 17	1.10	07.12	200						
• .		Det-	4.0	111	31.	31.10						
•	14	11/4/46	400	1.10		11.60 41.90						
					14							
	ITEM		START (SEC)	6	STOP (SEC)			ITEM		START (SEC)	_	STOP (SLC)
2	TI CAMERA No.	-	11.7				O-GRAPH		-	W.K.		WUN
	9 4	. 2					SANGAMO No.	- 9 F		W.C.		
				-		-	SABTS SEQ.			27.6		17.1
411.3	77.18	7.,	11.0		W 31	-	CALORIME	CALORIMETER (SABIS)		5 67		471
1 1111	LEGA OF	JULINOID	10.01	+	25.6		CALORIME	CALORIMETER (SLOW SHUTTER)	#11EK)	150		27.70
, ,	1	W. C. C.		-		DEE	W ass	W1 2131.7			7	
	1 17					KEL	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	13113	PAGE	- 1	5	1

LASER PERFORMANCE ANALYSIS, RUN VL1-268

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SELOND TURIN IFLAT

TOTAL INTENSITY

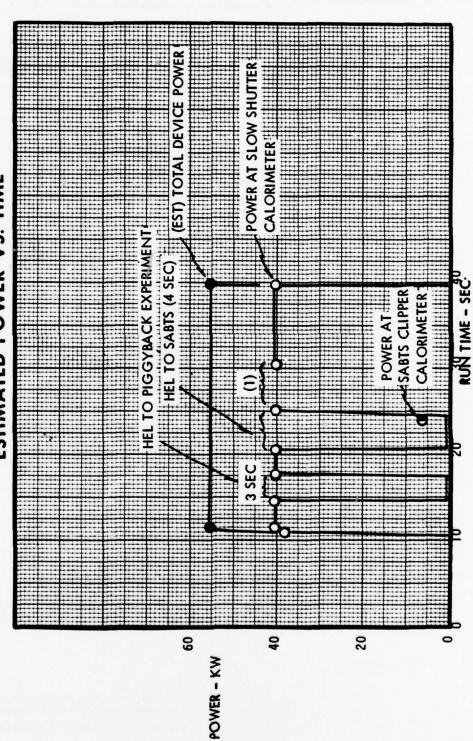
LINEAR PROFILE*

APPROX. TIME (SEC) _____

APPROX. TIME (SEC) ____

SANGAMO RECURDER NOT

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-269 **ESTIMATED POWER VS. TIME**



REMARKS: (1) CAROUSEL INDEXED AFTER 1St SAMPLE BURNED THROUGH.

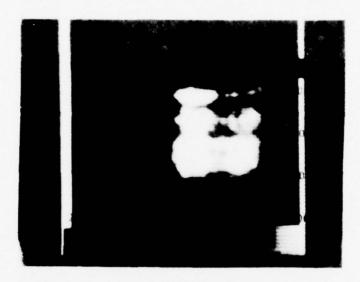
1. SNGS 2-10-77 PREPARED BY:

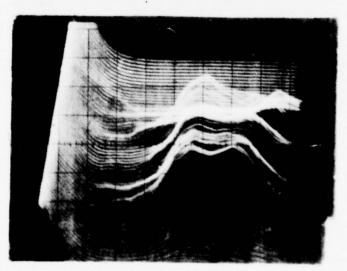
			QUICK LOOK TEST DATA	QUICK LOOK TEST DATA				
PLAN	SABTS	DATE	1 2-9-77	77	TIME 23	2307	5	
CL OSE	CLOSED (SEC) 39 6		LASING DURATION (SEC)	24.2	TOTAL COMPLETED TEST POSITIONS	WHETED 5	- PLANNED TOTAL PWR.	FWR. 54
, DE 1 /	PLANNED TEST NO. DEL / DAZ TIME LINES	NES		AS OF	DATE 2	7.6.7	-9.77REVISION	` .
	PLANNED LINEAR MAGNIFICATION PLANNED FEAK	1.7 IUKWICME		CONFIGURATION LIRFIEC	MATION LIREFICTIVE OF TRANSMISSIVE			
	PLANNED				ACTUAL	UAL		
COATING		FRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	FST. PWR. A) TARGET	TOTAL	ACTUAL SPOI DIAMITER	COMMINIS
	3.0 4	5	1400	13.5		24.8		
PE	4.0	01.	21.50	20.7		57.2		
DUF	1 0.4	01.	31.70					
PITTY PITTY		(11)	41.90	36.0		27.0		
7.12	1.1081 1.1081	03	WHEN	CALORIMETE	METE	R CAL	CAUGHT	FIEF
	START (SEC)	STOP	STOP (SEC)		ITEM		START (SEC)	STOP (SFC)
+	CN			O-GRAPH			W.K.A.	147.7.
	"			SANGAMO No. 1	J 70. 1		NIL	
	,,			SANGAMO No.	J No. 2		11.1.1.	
+	11.0	18	CALB	CALORIME!	CALORIMETER (SARIS)	+	11.5	47.1
Ĺ	17 17	, E		CALORIME	CALORIMETER (SLOW SHUTTER)	IUTTER	001	14.0
THE WENGEN E	END OF 1	375.6	5			+	11/4	22.6
1			RKI-	REF. 1CR M. 21.36	21.367	PAGE	~	7 50

AS SEEN BY IR CAMERA VIEWING SELOND TURN FLAT

APPROX. TIME (SEC) 20

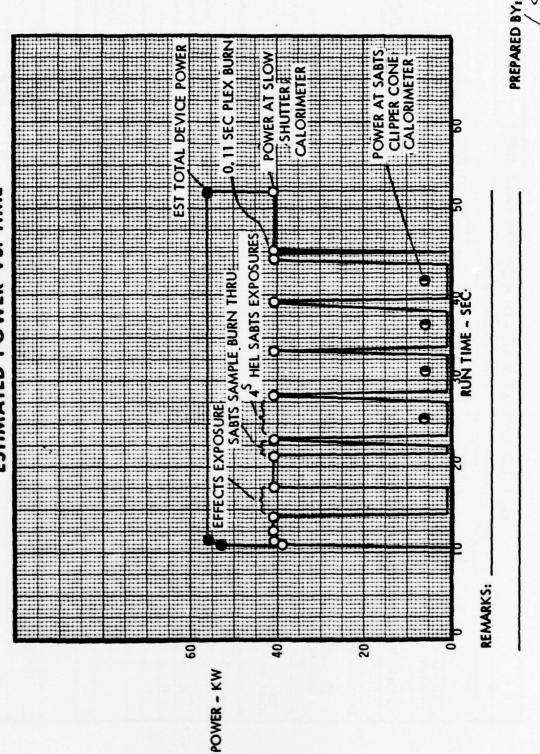
APPROX. TIME (SEC) 20





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LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-270
ESTIMATED POWER VS. TIME



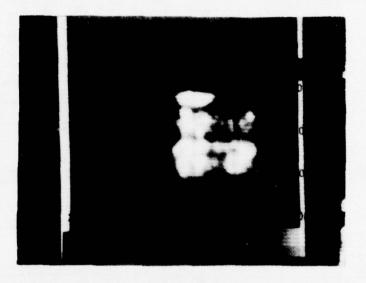
					QUICK LOOK TEST DATA	TEST DATA				
RUN NO.	RUN NO. V.11- 270	PLAN	N SABTE		DATE 2-16	2-10-77	TIME /	1935		
D2 FIRE VALVE OPEN (SEC)	SEC) 10.4		D2 FIRE VALVE CLOSED (SEC) 5	27.9	LASING DURATION (SEC)	41.5	TOTAL COMPLETED TEST POSITIONS	MPLETED 7	₹ <u>0</u>	PLANNED 57
PLAN	INED TES	T NO.0E	PLANNED TEST NO. 0E/2/0A3 TIME LINES	LINES		AS OF	DAT	DATE 2-10-77 REVISION	REVISIO	N DRIG
EXPERIMENTER	NTER		PLANNED LI	'	1.7	CONFIGURATION	SPECIFICATION SPECIFICATION			
O.	MULLEN	X	PLANNED PEAK /	YOI A	IOKW/CM*	1 1	TRANSMISSIVE			
			PLANNED				ACI	ACTUAL		
TEST POSITION	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	E TIME FROM	TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-	PLEXI		3.0	4.5	14.00	13.0		27.5		
7 0	×	31	4.0	1.10	_	20.7		56.8		
•		J00	4.0	1.10	510					
5		DOF	4.0	1.10						
9		3500H		01.1	36.90					
	*	HOUSE	4.0	1.10	41.90					
		LIEN	++			20.9		56.9		
	ITEM		START (SEC)	15	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
2	TV CAMERA No.	1.	NO			O-GRAPH	_		MON.	MOM
	Š	0. 2	ı,			SANGAMO No.	O No. 1		6.0	54.0
	Ž	No. 3	2			SANGAMO No.	10 No. 2		N/A	
		0. 4	•			SABTS SEQ.	Ġ		21.5	47.1
MIND		TUNNET	11.0	`	18.00	CALORIM	CALORIMETER (SABTS)		21.5	47.1
25	_!	NI CITION	0 9.	-	-	CALORIM	CALORIMETER (SLOW SHUTTER)		10.0	/4.0
HI	MO	DIENOID	0	-	52.6		=	3	15.0	21.5
FPFF	して	MIRROD	END OF 1			-	:	:	47.1	52.6

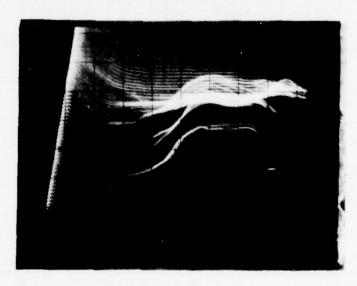
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

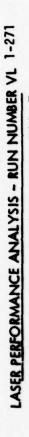
LINEAR PROFILE*

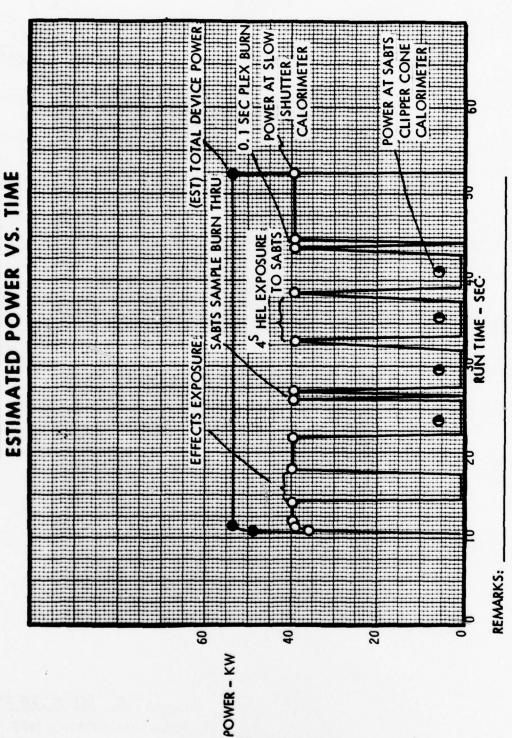
APPROX. TIME (SEC) 20





LEE BERGERSON





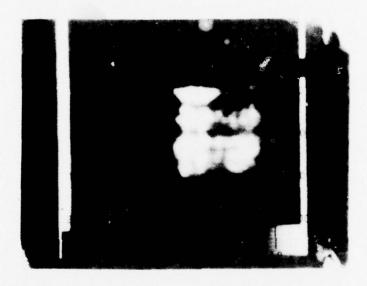
PREPARED BY:

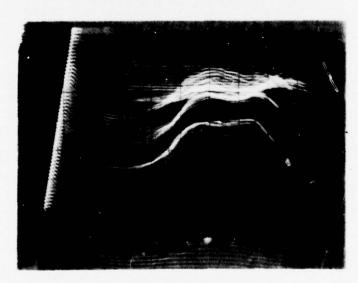
					QUICK LOOK TEST DATA	TEST DATA				
TON NO.	RUN NO. V.Z. 271	/ PLAN	N SABTS		DATE 2-10-77	1-77	TIME 22	2209		
D2 FIRE VALVE OPEN (SEC)	VE 10.4		D2 FIRE VALVE CLOSED (SEC) 5	52.4	LASING DURATION (SEC)	145.0	TOTAL COMPLETED TEST POSITIONS	APLETED 7	PLANNED TOTAL PWR.	PWR. 5-9
PLAN	NED TES	PLANNED TEST NO.052/RCI	1 11	TIME LINES		AS OF	DAT	DATE 2-10-77	REVISION	σ
EXPERIMENTER	TER		PLANNED L	47	1.7	CONFIGURATION	JRATION TREFLECTIVE			
0	MULLEN	NE	PLANNED PEAK PWR DENSITY	EAK 10	KWICM		TRANSMISSIVE			
			PLANNED				ACTUAL	UAL		
TEST POSITION	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	WE TIME FROM F2	TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
- 4	RCI		3.0	4.5	14.00	13.5		55.8		
7 6	×	DOF	4.0	1.10	21.50	21.2		55.5		
7		PE	4.0	1.10						
2		DOF	4.0	1.10	31.70					
9		1-E11 >	4.0	1.10	36.80					
	*	PETTY	4.0	1.10	41.90					
					47//	5/.9		55.6		
	ITEM		START (SEC)		STOP (SEC)		ITEM	-	START (SEC)	STOP (SEC)
77	TV CAMERA No.	-	NO	-		O-GRAPH		+	MAN	MOM
	2	. 2	4			SANGAMO No.	0 No. 1		6.0	54.0
	Š	. 3	=			SANGAMO No.	O No. 2		NIG	
		7	4			SABTS SEQ.	نہ		21.5	47.1
MIND	TUNNEL	NEL	11.0	`	00.8	CALORIM	CALORIMETER (SABTS)		21.5	47.1
SAB						CALORIME	CALORIMETER (SLOW SHUTTER)	HUTTER)	10.0	14.0
HI F	FLOW CO	COLENDID	10.0		25.6		11	-	150	21.5
KFF			ENO OF	_		1	2	-	47.1	52.6

AS SEEN BY IR CAMERA VIEWING FIRST TURN FLAT

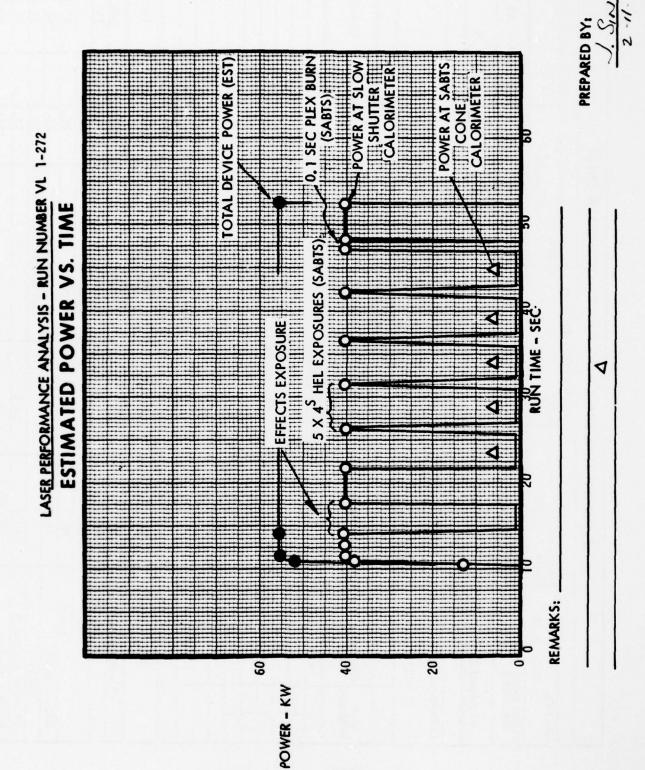
APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20





LEE BERGERSON

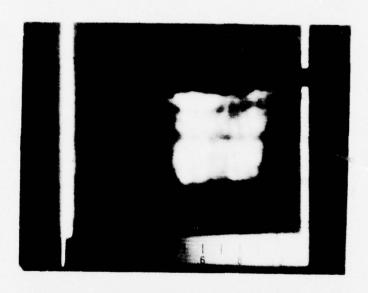


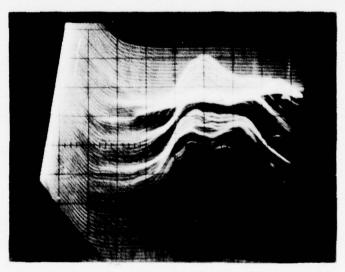
CNA					QUICK LOOK TEST DATA	TEST DATA				
	VL1- 272	2 PLAN	SABTS	à	DATE 2-11-	-77	TIME	1920	_	
DZ FIRE VALVE OPEN (SEC)	10.4	4 CLOSED (5	E VALVE ED (SEC) 5	2.4	LASING DURATION (SEC)	42.0	TOTAL COMPLETED TEST POSITIONS	APLETED 7		PLANNED TOTAL PWR. 59
PLANNE	D TEST	PLANNED TEST NO. 063/111		TIME LINES		AS OF	DAT	DATE 2-11-77REVISION	REVISIC	N A
EXPERIMENTER			PLANNED L MAGNIFIC		1.7	CONFIGURATION	JRATION TREFIECTIVE			
D. MULLEN	LEN		PLANNED FEAK	10	kw/cm ²	M	TRANSMISSIVE			
			PLANNED				ACI	ACTUAL		
IEST SPE	SPECIMEN NO.	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENIS
-	į,		3.0	4.5	14.00	14.0		57		
~	•	1			0.00	200				
,		26	4.0	1.10	26.60	40.1		2/		
3		Der	4.0	1.10	31.70					
•		PEITY	4.0	1.10	36.80					
	*	PETTY	4.0	1.10	41.90					
		PLOXI	.11		47.00					
					47.11	51.4		26.5		
	ITEM		START (SEC)	STG	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
NCA	TV CAMERA No.	-	No			O-GRAPH			HAN.	HAN.
	No. 2	2	ON		•	SANGAMO No.	0 No. 1		0.9	54
	No. 3	3	No			SANGAMO No.	O No. 2		N/A	
	2	4	Na		1	SABTS SEQ.	ď		21.5	47.1
WIND TUNNEL	EL.		11.0	18	18.00	CALORIM	CALORIMETER (SABTS)		21.5	47.1
SABTS INST.	NST.					CALORIMI	CALORIMETER (SLOW SHUTTER)	HUTTER)	10.0	14.0
HI FLOW SOLENOID	OLENOII		10.0	52.6	9.				15.0	21.5
EFFECT MIRROR	RROR		END OF 1						47.1	52.6

AS SEEN BY IR CAMERA VIEWING FIRST TURN FLAT

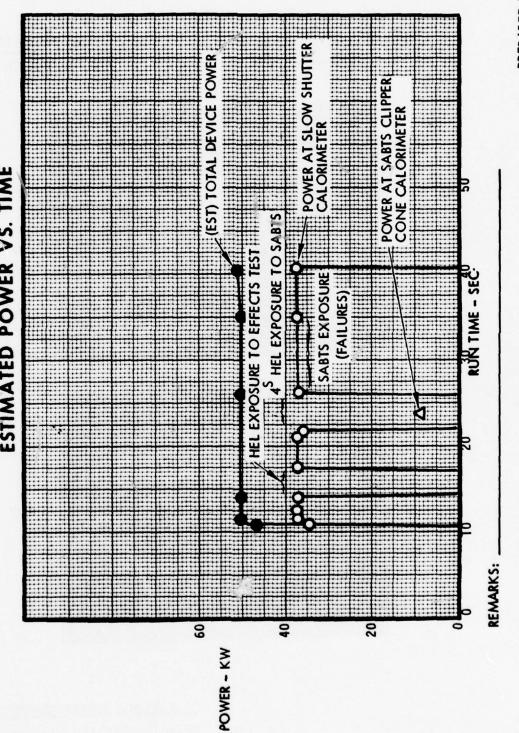
APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20





LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-273 **ESTIMATED POWER VS. TIME**



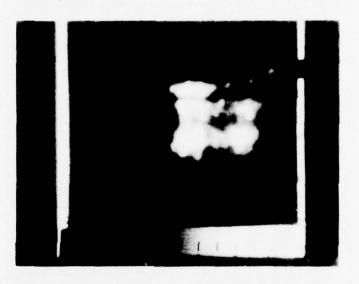
PREPARED BY

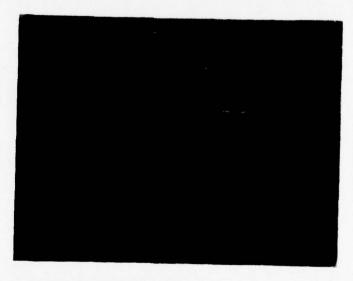
					QUICK LOOK TEST DATA	TEST DATA				
EUN NO.	VL1-273	FAN PLAN	SABTS	۵	DATE 2-15	- 77	TIME	2113		
D2 FIRE VALVE OPEN (SEC)		10.4 CLOS	D2 FIRE VALVE CLOSED (SEC) 4	40.7	N (SEC)		TOTAL COMPLETED	WPLETED 5		PLANNED TOTAL PWR. 59
PLAN	INED TE	PLANNED TEST NO.OE4	×	TIME LINES	A	AS OF	DATE		2-14-77 REVISION	Z N
EXPERIMENTER	NTER		PLANNED I		7.7	CONFIGURATION	JRATION PREFIECTIVE			
D.	MULLEN		PLANNED PEAK PWR DENSITY		10 ku/cm ²	X	TRANSMISSIVE			
			PLANNED				ACI	ACTUAL		
IEST POSITION	SPECIMEN NO.	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	E TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
	1535		3.0	4.5	14.00	13.0		53.3		
-	*	Dore	4.0	1.10	21.50	20.7		53.6		
•		DC	4.0	1.10	26.60					
5		DOF	7.0	1.10	31.70					
•		PETTY	4.0	1.10	36.80					
	*	PETTY	4.0	1.10	41.90	39.6		53.9		
		PLAXI	ı.		47.00					
>	NOTE: 1	TEST TEN	BMINATED	NO AFTE	6	Y SMBL		SPECINOEN.		
	ITEM		START (SEC)		STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
2	TV CAMERA No.		NO			O-GRAPH			HAN.	HAN.
	Z	No. 2	NO			SANGAMO NO	- 920		6.0	54
	Z	No. 3	No			SANGAMO No.	O No. 2		N/A	
	Z	No. 4	ON		1	SABTS SEQ.	ċ		21.5	47.1
WIND TUNNEL	TUNNEL		11.0	11	18.00	CALORIM	CALORIMETER (SABTS)		21.5	47.1
VS.	SABTS INST.					CALORIM	CALORIMETER (SLOW SHUTTER)	HUTTER	10.0	14.0
HI FLO	FLOW SOLENOID	ID	10.0	5.	52.6				15.0	21.5
EFFECT	EFFECT MIDDOD		FND OF 1						1 17	9 65

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20





1 Sings PREPARED BY: EST) TOTAL DEVICE POWER POWER AT SLOW SHUTTER
CALORIMETER LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-274 CAROUSEL FAILED TO INDEX **ESTIMATED POWER VS. TIME** RON TIME - SEC POWER AT SABTS SABTS SAMPLE EXPOSURE CLIPPER CONE CALORIMETER EFFECTS EXPOSURE REMARKS: 9 40 20 0 POWER - KW

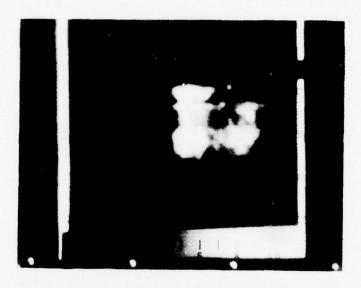
					QUICK LOOK TEST DATA	TEST DATA				
EUN NO.	VII - 274	TEST PLAN	SPACE		DATE 2-16	- 77	TIME 2	23/6		
D2 FIRE VALVE OPEN (SEC)	FG 10.4		D2 FIRE VALVE CLOSED (SEC) 4	40.7	LASING DURATION (SEC)	30.3	TOTAL COMPLETED TEST POSITIONS		2 107	PLANNED TOTAL PWR. 59
PLAN	NED TEST	NO.06.	PLANNED TEST NO. OF A MUTTIME LINES	LINES		AS OF	DAT	2.16.7	DATE 2-16-77 REVISION	Z Z
EXPENIMENTER D. M.	WENTER D. MULLEN R. DELVOER	3 4	PLANNED LINEAR MAGNIFICATION PLANNED FEAK	38	1.7	CONFIGURATION ERRELEC	JEATION JEREFLECTIVE TRANSMISSIVE			
			PLANNED				DY	ACTUAL		
TEST POSITION	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
- ~	5775		3.0	4.5	14.00	14.0		26.9		
6	12		4.0	1.10	21.50	20.7		56.6		
4 5			4.0	0/1	26.60					
9	*		4,0	1.10	36.80					
			01.		41.90	1.04		56.6		
	NOTE	5: 60	NETTE	010	NOT IN	INDEX TI	SECON	di	DOLITION	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	ITEM		START (SEC)	SIC	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
7	TV CAMERA No.	-	NO			O-GRAPH			MAN	MAN
	76. 2	2	1,			SANGAMO No.	0 Ne. 1		6.0	48.0
	Z6. 3	3	7			SANGAMO No.	O No. 2		WIA	
	2	•	"			SABTS SEQ.	7		21.5	42.0
WIND	TUNNET	7.3	11.0	//8	18.0	CALORIM	CALORIMETER (SABTS)		21.5	42.0
SAB	SABTS INST.					CALORIM	CALORIMETER (SLOW SHUTTER)	HUTTER)	10.0	14.0
41 6	HI FLOW SOLKWIND	diales D	10.0	46	46.0				0.27	21.5
LE FELL	BCTSA	EFFIBETS MIRKOR KNO	1 wo ok						42.0	46.0

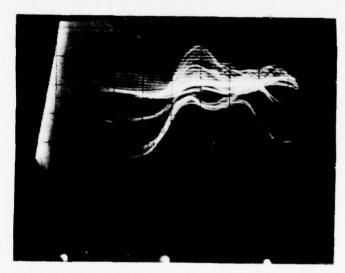
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

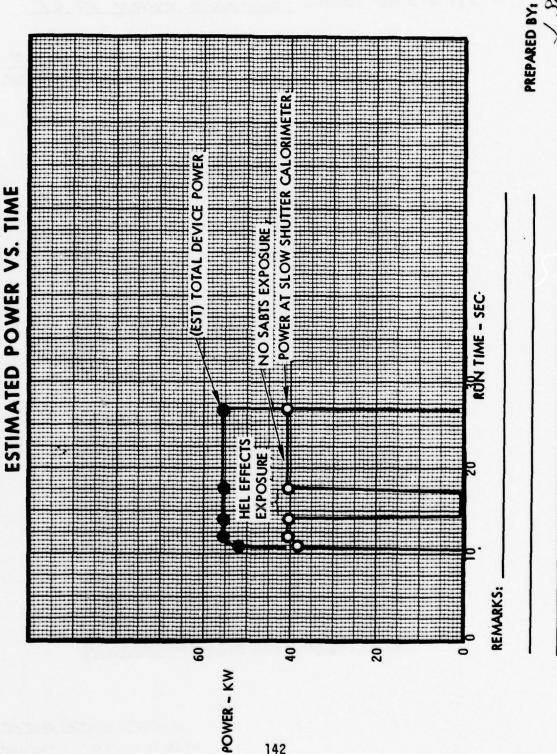
TOTAL INTENSITY APPROX. TIME (SEC) 20

LINEAR PROFILE* APPROX. TIME (SEC) 20





LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-275



RUN NO. VLI - 275 D2 FIRE VALVE OPEN (SEC) 9.9				QUICK LOOK TEST DATA	TEST DATA	QUICK LOOK TEST DATA			
1	PAN PAN	SABTS		DATE 2-17-	-77-	TIME 20	2048		
	22 20 20 20	W.	8	LASING DURATION (SEC)	16.9	TOTAL COMPLETED TEST POSITIONS	WETED /	₹ [2	PLANNED TOTAL PWR. 59
PLANNED TEST NO. 06/9/HXSTIME LINES	10.06/	9/HSCSTIME	LINES		AS OF	DAT	3-17-7	DATE 2-17-77 REVISION	S NO
EXPENMENTER D. MULLEN R. Delver		PLANNED LINEAR MAGNIFICATION PLANNED FEAK	INEAR /.	1.7 10 kw/len	CONFIGURATION BE REFLEC	URATION GREELECTIVE TRANSMISSIVE			
11		PLANNED				ACTUAL	UAL		
TEST SPECIMEN C	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST. PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
1 4/54.52		3.0	8.	/4.00	13.0		56.8		
8	DOG	4.0	1.60	21.50	25.8		57.0		
7	DOF	4.0	1.60	27.10					
	PE	4.0	1.60	32.70					
7 * 9	PE	4.0	1.60	38.30					
8	PLEY	01.		43.90					
NOTE: G	BEFEE	TO MIRROR	FOR MIC	03	DROPPRD	OUT P	PREVIEW	ME	SOBTE TELL
ITEM		START (SEC)	15	STOP (SEC)		ITEM	-	START (SEC)	STOP (SEC)
TV CAMERA No. 1		30	-		O-GRAPH			MAN.	Min.
76. 2		1			SANGAMO No.	O No. 1		6.0	50.0
No. 3		•			SANGAMO No.	O No. 2		11/18	
A. o.		N			SABTS SEQ.	Ġ		21.5	44.0
WIND THANEL		11.0	"	6.0	CALORIM	CALORIMETER (SABTS)		24.5	44.0
SABTS INST.					CALORIM	CALORIMETER (SLOW SHUTTER)	+UTTER)	10.0	14.0
HI FLOW SOLAWOID	010	0.01	46	48.0	-	•	.,	17.0	21.5
KFFETT MIRROR		I JO ON			•	**	"	44.0	48.0

LASER PERFORMANCE ANALYSIS, RUN VL1-275

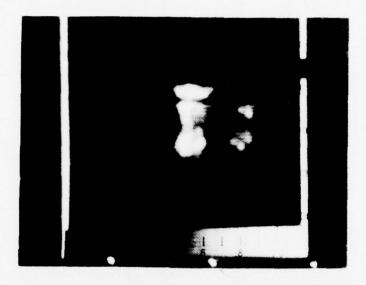
BEAM INTENSITY PROFILE

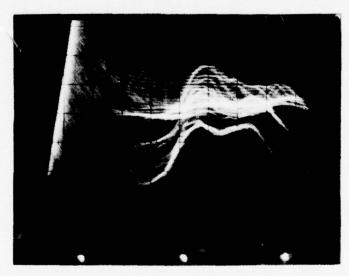
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

LINEAR PROFILE*

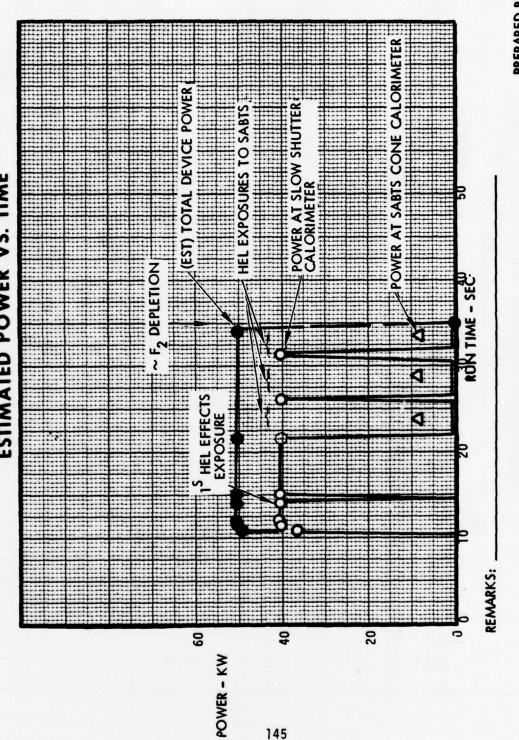
APPROX. TIME (SEC) 20





LEE BERGERSON
BEAM DIAGNOSTICS ENGINEER

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-276 **ESTIMATED POWER VS. TIME**



PREPARED BY:

					QUICK LOOK TEST DATA	TEST DATA				
RUN NO.	111- 276	PLAN		۵	DATE 2 - 17 - 77	77	TIME	22/		
D2 FIRE VALVE OPEN (SEC)			DE FIRE VALVE CLOSED (SEC) 3	35.0	LASING DURATION (SEC)	24.6	TOTAL COMPLETED TEST POSITIONS		S TOTAL	PLANNED 59
PLAN	NED TES	T NO. 0E	PLANNED TEST NO. OF 19/644 TIME LINES	LINES	1	AS OF	DATE	E 2-177.	2-/7-77 REVISION	A
EXPERIMENTER D. M.	NIER MULLEN	3	PLANNED LINEAR MAGNIFICATION	INEAR TION	Z	CONFIGURATION IN THE REFLECT	MATION			
è	Detysor	2	PWR DENSITY		OKWICHT	2	IKANSMISSIVE			
			PLANNED				ACI	ACTUAL		
ROSITION	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	TIME FROM	TIME	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
	PLEK!		7.0	5.9	14.00	13.5		26.9		
	**	Dor	4.0	1.60	21.50	19.7		57.1		
1		DOF	4.0	1.60	27.10					
5		PE	4.0	1:60	32.70					
9	*	DE	4.0	1.60	38.30					
		PLEXI	.10		43.90					
	1/45/4	Devid	7000	20016	44.0	11 0000	1	00.	1	
	3 100		3		41 10	1000	10 Cm	200	2 2 3	2000
	ITEM		START (SEC)	SIC	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
2	TV CAMERA No.	-	NO			O-GRAPH			MON!	MAK
	2	No. 2	"			SANGAMO No.	D No. 1		6.0	50.0
	No	No. 3	"			SANGAMO No. 2	0 No. 2		NIA	
	No. 4	-	"			SABTS SEQ.	نہ		24.5	44.0
DNIM	TUNNEL	700	11.0	(8	18.0	CALORIM	CALORIMETER (SABTS)		24.5	44.0
Y :	SABIS INST.			7		CALORIM	CALORIMETER (SLOW SHUTTER)	HULLER	0.01	14.0
716	- 1 -	CALOLD	10.0	48.0	0.0	=	٤.	*	17.0	3/15
シャン	The sales	BOXOLA	15410 OK	-	-	-	-	-	000	787

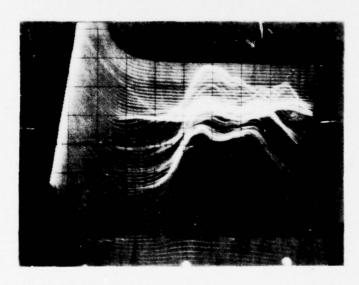
LASER PERFORMANCE ANALYSIS, RUN VL1-276

BEAM INTENSITY PROFILE

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) 20

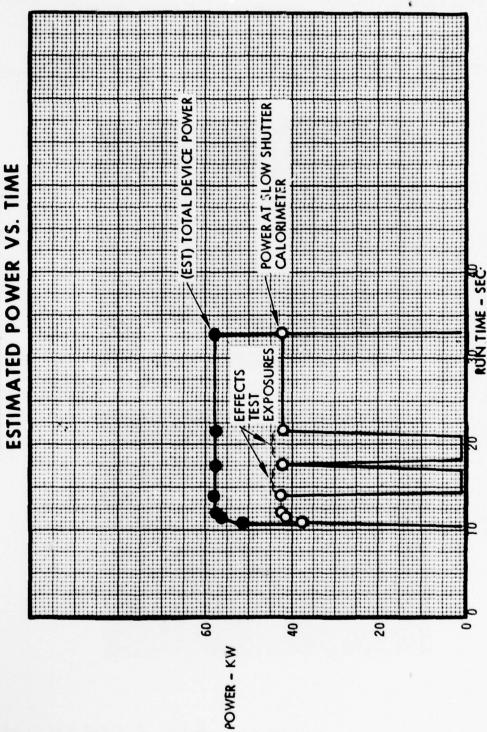




LEE BERGERSON

BEAM DIAGNOSTICS ENGINEER

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-277



PREPARED BY:

REMARKS: NO HEL SABTS EXPOSURE ACHIEVED ON THIS TEST

2-22-77

			PWR. 59	4	L PLOSI		COMMENTS						ВАСК	STOP (SEC)	MAN.	35.0			24.1	25.7	33.0	or 4
			2 PLANNED TOTAL PWR.	7 REVISIO			ACTUAL SPOT DIAMETER						PIGGY	START (SEC)	MAN.	6.0	N/A	NIA	72.	7.12	29.1	3
TIME LINES AND QUICK LOOK DATA SHEET		2239	<u>a</u>	DATE 2-18-77 REVISION		ACTUAL	TOTAL	58.8	1			58.6	2 WING						()	SHOHEN		PAGE
OOK DA		TIME	TOTAL COMPLET TEST POSITIONS	DA	JRATION SREFLECTIVE TRANSMISSIVE	Ä	EST. PWR. AT TARGET						FELLO	ITEM	F	MO No. 1	MO No. 2	Ö	CALORIMETER (SABTS)	METER (SEON		REF: 1CR M42/37
QUICK L	TEST DATA	22-77	22.6	AS OF	CONFIGURATION RATEFIE TRANS		TIME	14.0				31.4	RESER		O-GRAPH	SANGAMO No.	SANGAMO No.	SABTS SEQ.	CALORIA			7: TCR &
IES AND	QUICK LOOK TEST DATA	DATE 2-22	LASING DURATION (SEC)		1.7 10 KW/CM=		TIME FROM	14.00	18.10	25.10	29.10		NOT TS TE	STOP (SEC)					0.2		33.0	`
			33.0	2535	10471	11	TRANSIT TIME (POST EXPOSURE)	01.10	4.0				R DID	STC	-				22	+	33	
PLANNED		SABTS		2575 / IMS/	PLANNED LINEAR MAGNIFICATION PLANNED PEAK PWR DENSITY	PLANNED		2.0	2,0	4.0			SHIVETE	START (SEC)	NO	1	•	-	15.0	END OF 2	21.0	
		PLAN	D2 FIRE VALVE CLOSED (SEC)	NO. 6E1			COATING			* HIGHES/DOF			FAST					1	3	f		
		- 277	10.4	PLANNED TEST NO. GE	MULLEN Delyser		SPECIMEN O	SWI	200	* H/L			NOT'	ITEM	TV CAMERA No. 1	No. 2	No. 3	Y .oZ	INNNET	SMIRKOR	105	PROFILER
		RUN NO. V. 1 - 1	D2 FIRE VALVE OPEN (SEC)	PLANN	EXPERIMENTER D. M.		rest Position		1	7	5	9			2				ONIN	EFFECT	HI FLOW	* PROF

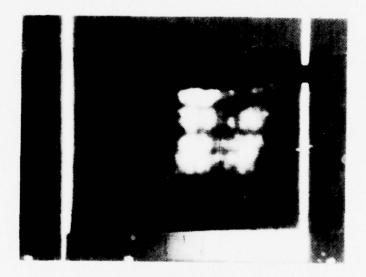
· LASER PERFORMANCE ANALYSIS, RUN VLI-277

BEAM INTENSITY PROFILE

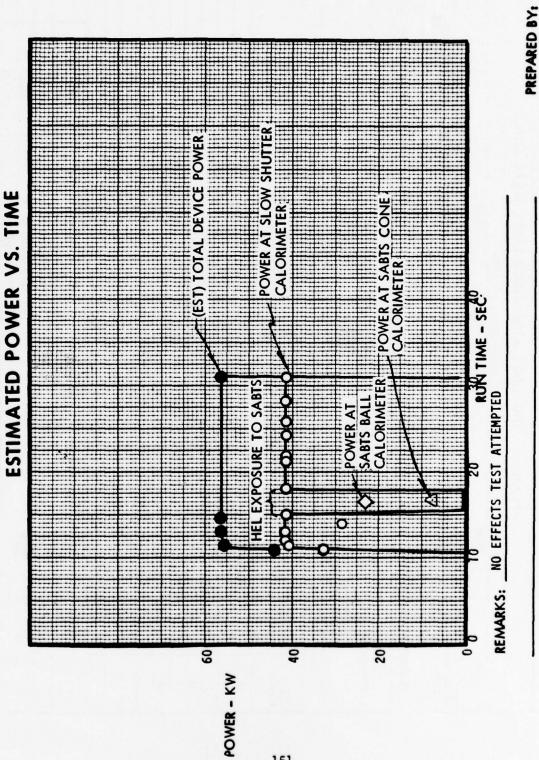
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) N/A



LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-278



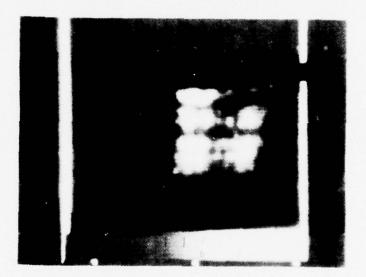
		PLANNED 59	B			ACTUAL SPOT COMMENTS DIAMETER					START (SEC) STOP (SEC)	W MAN.	0.58 0	4	25.7		
A SHEET		O145 COMPLETED	DATE 2.22-77 REVISION		ACTUAL	TOTAL POWER	57.9	57.6			STARI	MAN	6.0	NIA	NIA		" 217
LOOK DATA	TIME	TOTAL TEST PC		JRATION DEREFLECTIVE L. TRANSMISSIVE	DV.	E ESI. PWR.	2				ITEM	O-GRAPH	SANGAMO No. 1	SANGAMC No. 2	SABIS SEQ.	CALORIMETER (SLOW SHUTTER)	1, ",
PLANNED TIME LINES AND QUICK LOOK	ICK LOUR TEN	2-23-77 LASING DURATION (SEC) 20.5	AS OF	CONFIGURATION CONFIGURATION SEFFIE CONFIGURATION CONFIGURATION CONFIGURATION CONFIGURATION		TIME FROM TIME	21.70 13.5	25.70 30.4		;	(SEC)	9-0	SAN	SAN	SABI	CALC	
ED TIME LINE	a	6	TIME LINES		11 '	POST (POST LXPOSURE)				 	C) STOP (SEC)						
PLANN	TEST	S SEC.	GEY TIM	PLANNED LINEAR MAGNIFICATION PLANNED PEAK PWR DENSITY	PLANNED		1 par 4.0				START (SEC)	NO	**	"	*		12.0
		10.4	PLANNED TEST NO.	MULLEN		SPECIMEN COATING NO. DESIGN	* HVGHES				ITEM	TV CAMERA No. 1	Z6. 2	No. 3	Z. 4	INST.	T MIRROR
	RUN NO.	D2 FIRE VALVE OPEN (SEC)	PLANN	EXFERIMENTER		POSITION SP	-	3	4 5	9		N CA				SABTS INST	EFFECT

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

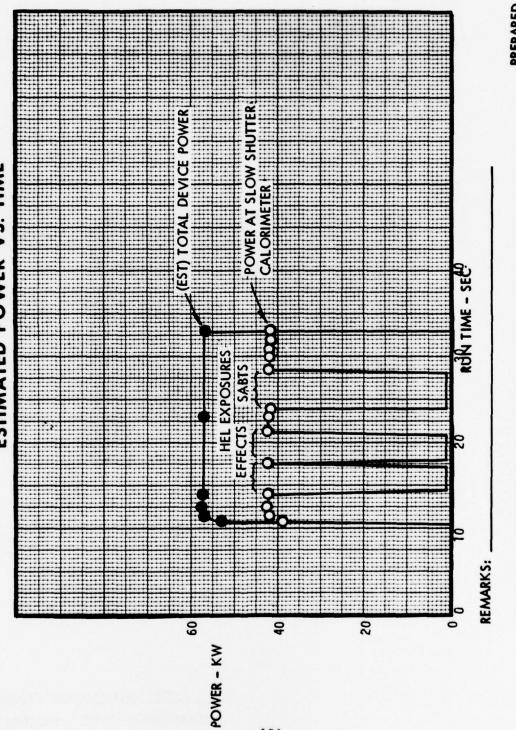
TOTAL INTENSITY

LINEAR PROFILE* APPROX. TIME (SEC) 20 APPROX. TIME (SEC) N/A



LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-279 **ESTIMATED POWER VS. TIME**



PREPARED BY:

			QUICK LOOK TEST DATA		QUICK LOC	QUICK LOOK TEST DATA				
RUN NO.	111-279	P.S.	CORT	\ \ \	DATE 2 -	-24-77	TIME	930		
D2 FIRE VALVE OPEN (SEC)		D2 FIRE	D2 FIRE VALVE CLOSED (SEC) 3	33.0	LASING DURATION (SEC)	0 23.1	TOTAL COMPLETED TEST POSITIONS		₹ <u>0</u>	PLANINED 59
PLANA	PLANNED TEST NO. SW2/SCS3TIME LINES	. SW2	6E 2 TIME	LINES		AS OF	DAT	E 2.25	77REVISIO	DATE 2-25 77REVISION OFFIG
EXPERIMENTER D. M	MENTER D. MULL KN		PLANNED LINEAR MAGNIFICATION PLANNED PEAK		1.7	CONFIG	JRATION MEFLECTIVE			
A	DakyceR		PAR DENSIT		IO KW/CM		AC	ACTUAL		
TEST S	SPECIMEN COAT	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	ME TIME FROM F2	M TIME SLICE	EST, PWR. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-	SWZ 0/60	09	3.0	1.10	14.00	0.61		58.6		
1	5653		3.0	4.0	18.10					
-	# HVGHE	HVEHECLOOP	4.0		25.10	23.2		58.0		
, ,	+				2017	325		87.8		
	ITEM	}-	START (SEC)		STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
7	TV CAMERA No. 1	-	NO			O-GRAPH			MIAN.	MAN.
	No. 2		1.			SANGAMO No.	O No		0.9	35.0
	76.3	-	"			SANGAMO No.	O No. 2		WIA	
	76. 4	-	4	-		SABIS SEQ.	Ċ		MIA	
WIND	TUNNEL		15.0	9,	22.0	CALORIM	CALORIMETER (SABTS)	-	25.1	29.1
27/17	GUITTOLINE	E/	END OF 1			CALORIM	CALORIMETER (SLOW SHUTTER)	HUTTER	10.0	14.0
BUUS	BEFFEET MIRROR		END OF 2	-		•	4		21.1	25.1
WI FL	CHOMETOS MOTE IN	0	21.0	-41	33.0	*	:		29.1	33.0

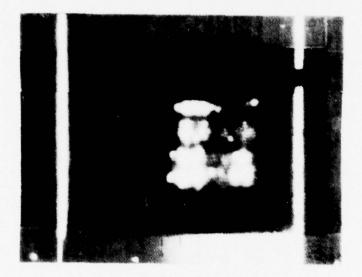
LASER PERFORMANCE ANALYSIS, RUN VL1-2-4

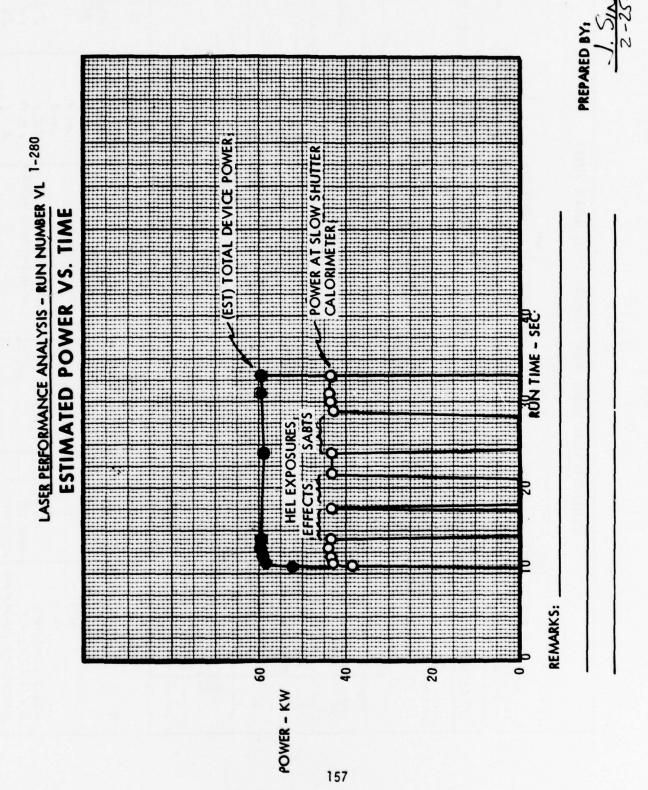
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND FURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) N/A





					QUICK LOOK TEST DATA	ILSI DATA				
EUR FIG.	WI-280	HAN	SABL		DATE 2-2	2-24.77	IIME 25.	22/0		
D2 FIXE VALVE OPEN (SEC)	10.4			33.0	DURATION (SEC) 22.6	22.6	TOTAL COMPLIED IEST POSITIONS	Oris Co		MANINED 59
PLANN	PLANNED TEST NO. SWE HERE LINES	10. SW3	K3 /HKI3TIME			AS OF	DATE	2-23-7	REVISIO	DATE 2-23-77 REVISION ORIG
EXPRIMENTER D. A.	D. MVLLEW P. DeLyler	> ~	PLANNED LINEAR MAGNIFICATION PLANNED PEAK IWR DENSITY		3.7 30 KW/cm*	CONFIGURATION MILTEC LITANIS	MATION METECTIVE 1 TRANSMISSIVE			
			PLANNED				ACTUAL	M		
IISI SF PCSIIION	SPECIMEN CO	COATING	EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	IIME FROM	IIME	EST. PWR. AT TAKGET	TOTAL	ACIUAL SPOI DIAMITER	COMMENIS
- 2	SW3 9	828	3.0	4.0	14.00	14.0		569		
ς,.			1		1	000		203		
100	-	avoae), ver	A.F.		22.10	31.4		597		
						4.00				
	IEM	200	START (SEC)	35	STOP (SEC)		IIIM		START (SEC)	SIOP (SIC)
NCA	IV CAMERA TH. 1		80			O-GRAFII			wow.	WOW
	No. 2		*			SANGAMO No. 1	- No		6.0	35.0
	2 6. 3		= =			SANGAMO No. 2) Ho. 2	-	2/2	
J ONIA	WIND TUNNEL		15.0	7	22.0	CALCINIM	CALORIMITER (SABIS)		182	29.1
77/0	GUILLOTINE	GND	1 20 01			CALORIME	CALORIME IER (SLOW SHUTTER)	UTTER	0.0	14.0
361.00	EFFICES MIRROR		1000			4			21.1	25.1
1079 11	HI FLOW SOLFNOID	010	21.0	3,	33.0	•	;	-	29.1	33.0

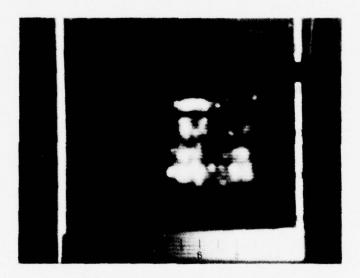
LASER PERFORMANCE ANALYSIS, RUN VLI-280

BEAM INTENSITY PROFILE

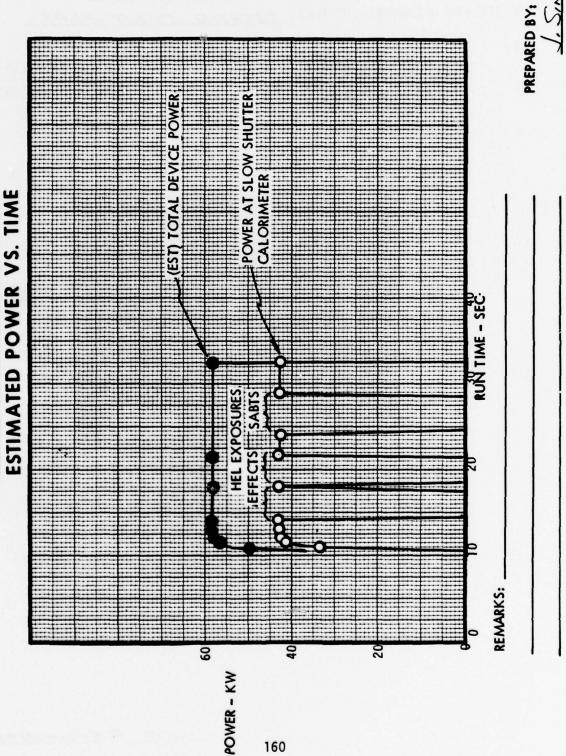
AS SEEN BY IR CAMERA VIEWING SECOND TURIN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) N/A



LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-281



					QUICK 100	QUICK LOOK TEST DATA				
RUN NO.	o. V11- 281		PLAN SABTS	7	DATE 2-2	2-25-77	TIME	9600		
DZ FIRE VALVE CPETI (SEC)		8	D2 FIRE VALVE CLOSED (SEC)	32.5	LASING DUKATION (SEC)	0 22.6	TOTAL CO ILST POSI	APPLIED STO		MANITED 59
PLAN	NED TES	1 NO. 5	PLANNED TEST NO. SW4/MINGTIME LINES	ETINES		AS OF		E 2.23-7	PREVISIO	DATE 2.23-77REVISION OPIG
D. M.	RIMENTER D. MULLEN R. Dalyson	3 4	PLANNED LINEAR MAGNIFICATION FLANNED PEAK	ATION ATION FAK TY 30	30 KW/cm2	CONFIGURATION MREFIE () IRANS	JRATION MEFFECTIVE () TRANSMISSIVE			
			PLANNED				ACTUAL	IMI		
IEST POSITION	SPECIMEN NO.	COATING	G EXPOSURE TIME (SEC)	TRANSIT TIME (POST EXPOSURE)	IME FROM (E) F2	N TIME SHICE	EST, PWK. ATTAKGLI	IOIAI FOWIK	ACTUAL SPOT DIAMETER	COMMITTE
-	5W4	9753	3.0	1.10	14.00	0.410		59.2		
7	HSCS 4		1	4.0	18.10					
	**				,	+				
• -	-	HUGH ST. IDO	206 4.0		29.10	23.8		28.6		
٠						31.4		58.8		
	ITEM		START (SEC)		STOP (SEC)		IIEM		START (SLC)	STOP (N.C.)
2	TV CAMERA No. 1	-	80			O-GRAPH			MAN	MAN.
	- <u>-</u>	. 2				SANGAMO No. 1	O 140. 1		6.0	35.0
	F 10. 3	.3	*			SALIGAMO No. 2	O No. 2		W/A	
	Flo. 4	-				SABIS SEQ.	ċ	-	NIB	
MIND	TUNNEL	7		1	23.0	CALORIM	CALORINETER (SABIS)	``	1.52	29.1
77//	GUILLOTING	0000	ENDOR			CALORIM	CALORIME ILK (SLOW SHOLLER)		0.01	74.0
0 /2	WI ELAN COLENDO	Cours.	21.0	-	320			-	1.60	33.0

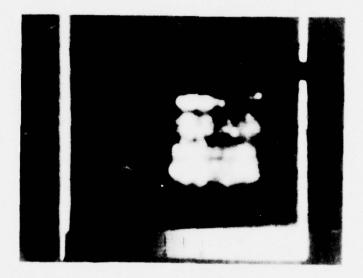
LASER PERFORMANCE ANALYSIS, RUN VL1-581

BEAM INTENSITY PROFILE

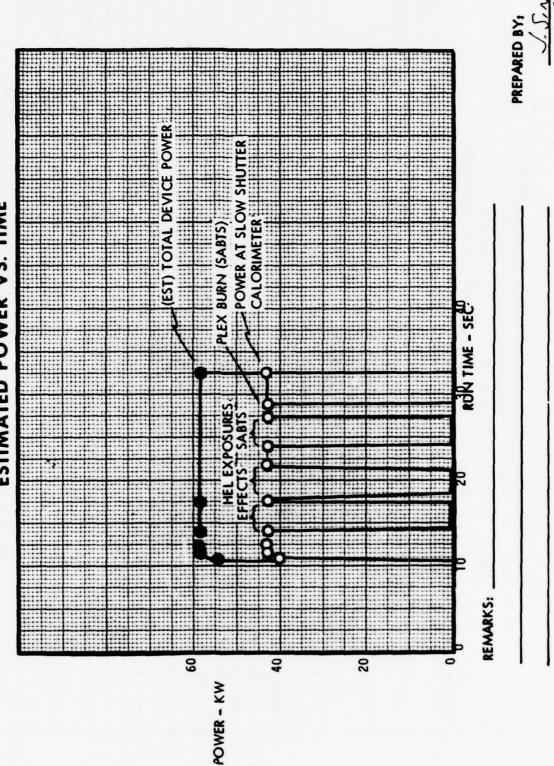
AS SEEN BY IR CAMERA VIEWING STOOND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) N/A



LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-282 **ESTIMATED POWER VS. TIME**



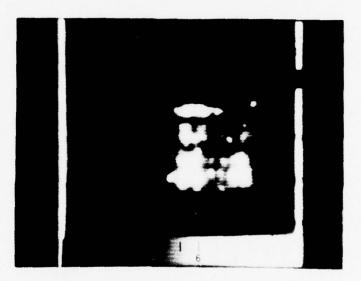
PLANNED TEST NO. SWS/MEY TIME LINES EXTERIMENTER EXTERIMENTER D. M. L.	0 == 3 00	2-2 16 110N (SEC 110N (SEC 11	6.77 22.6 AS OF	TIME OO 4 7 TOTAL COMPLETED TEST POSITIONS	00 47	PLANNED	
D TEST NO. SWS/JURE/TIME CLOSED (SEC) 3 GE 5 GE 5 CLOSED (SEC) 3 GE 5 GE 5 CLOSED (SEC) 3 GE 5 CLOSED (SEC) 3 CLOSED (SEC) 3 FLANNED III MAGNIFICAL PLANNED FILE PLANNED FLANNED FLANNED W 5 O 160 3.0 2.0 2.0	1 2 == 3 00	NG ATION (SEC) W/CM Z 11ME FROM 13.00		TOTAL CON			
MO. SWS/INE, TIME TLANNED III MAGNIFICAL PUR DEISSIT PLANNED FE PUR DEISSIT PLANNED FE PUR DEISSIT PUR SEC	1 2 == 3 00		S OF				PVIR. 59
PLANNED LII MAGNIFICALI PLANNED FE PWR DEI-1SITY PLANNED PLANNED PLANNED DESIGN TIME (SEC) TIME (SEC) 2.0	0 Sugar 100			DATE	2-25-7	DATE 2-25-77REVISION	9100
SPECIMEN COATING EXPOSURE NO. DESIGN TIME (SEC)	CANSIT TIME (POST EXPOSURE)	TIME FROM F ₂	CONFIGURATION PAREFLEC	JRATION REFLECTIVE TRANSMISSIVE			
SPECIMEN COATING EXPOSURE NO. DESIGN TIME (SEC) SWS 0/60 3.0 SHR / Z.0	EXPOSURE)	TIME FROM F ₂		ACTUAL	UAL		
SWS 0160 3.0	4.00	14.00	TIME	EST. PWK. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	CORAMERATS
SHR1	4.00		13.0		57.5		
		18.10	24.2		59.3		
1 BPS/PE 4.0	1.10	24.10					
DIEX!		29,20					
•		47.30	31.9		59.3		
ilem start (SEC)	STQ	STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
TV CAMERA No. 1 ON			O-GRAPH			MAN.	Man.
No. 2			SANGAMO No.	J 76. 1		6.0	34.0
No. 3			SANGAMO No.	O No. 2		WIA	
140. 4 11			SABTS SEQ.			NIO	
GUILLOTING GKOOF!			CALORINE	CALORIMETER (SABTS)		24.1	28./
			CALOKIME	CALOKINE IEK (SLOW SHULIEK)		0.0	2000
WI CLAW COLONIA 21.0	32.0	0				29.3	33.0

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

TOTAL INTENSITY

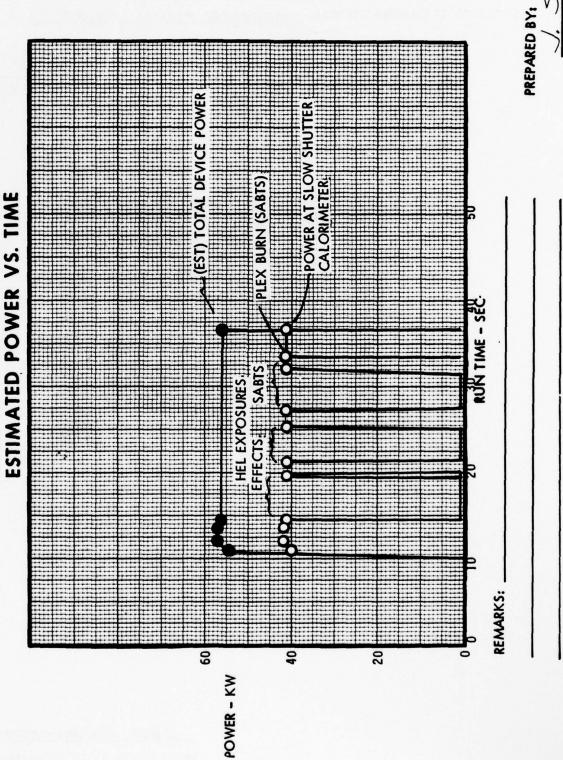
LINEAR PROFILE* APPROX. TIME (SEC) 20 APPROX. TIME (SEC) N/A



LEE BERGERION

BEAM DIAGNOSTICS ENGINEER

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-283
ESTIMATED POWER VS. TIME



Part						QUICK LOOK TEST DATA	TEST DATA				
D TEST NO. CALLEW PLANNED LINES SEC. 7 TEST POSITIONS PLANNED REAL PARTIES PLANNED REAL POSITIONS PLANNED REAL PARTIES	RUN NO.			3		DATE 2 - 2 (11.		148		
SPECIMEN PANNED LINES AS OF DATE 2-26-77 REVISION B	PHE V				2.0	LASING DURATION (SEC)	1.0	TOTAL COA			
PLAINED LINEAR 2.7 CONFIGURATION PLAINED LINEAR CONFIGURATION PLAINED FRAX 30 km/CMP CONFIGURATION PLAINED FRAX 30 km/CMP CONFIGURATION PLAN	INED TES	I NO.S.	es/merTIME	LINES		AS OF	DAT		PREVISIO		
SPECIMEN COATING EMPOSURE TRANSITTIME TIME FROM TIME EST. PMR. TOTAL SPOT START SEC EMPOSURE POWER DIAMETER START SEC EMPOSURE POWER DIAMETER START SEC EMPOSURE EST. PMR. TOTAL EST. PMR. XPERIME D	MER MVLL RAGEL	18	PLANNED L MAGNIFICA	INEAR TION		CONFIGURATI	ION FLECTIVE ANSMISSIVE				
SPECIMEN COATING EXPOSURE TRANSIT TIME TIME FROM TIME EST. PWR. TOTAL SPOT SPO				PLANNED		13771		ACT	UAL		
STARZ 4.0 1.10 14.00 13.5 57.0 14.00 19.10 27.3 57.0 19.10 27.3 57.0 19.10 27.3 57.0 19.10 27.3 57.0 19.10 27.3 26.0 57.2 19.10 27.3 26.0 57.2 19.10 27.3 28.10 28.10 28.10 28.10 28.10 28.10 28.10 28.10 28.10 28.10 28.10 28.10 28.10 29.10	TEST		COATING		TRANSIT TIM (POST EXPOSURE		TIME	EST. PWR.	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
WANKE 5.0 4.00 19.10 27.3 57.0	-	SAKZ		4.0	1.10	14.00	13.5		57.9		
#	7	HAWK!		5.0	4.00	19.10					
TEM START (SEC) STOP (SEC) START (SE	6			,					57.0		
PLEKT O. 33.20 36.0 57.2	•	-	HVEHESID	4	1:10	28.10					
TEM START (SEC) STOP (SEC) TEM START (SEC)	0		PLEKI	0.7							
ITEM START (SEC) STOP (SEC) ITEM START (SEC) IV CAMERA No. 1 OM No. 2 MAN. No. 3 U SANGAMO No. 2 M/N No. 4 U SANGAMO No. 2 M/N VILLOFLAYE EALO OP! CALORIMETER (SABTS) 29.10 SABTS INST. CALORIMETER (SLOW SHUTTER) 2.0.0 VILLOFLAYE VILLOFLAYE VILLOFLAYER VILLOF						20.00			1		
TV CAMERA No. 1		ITEM		START (SEC)		TOP (SEC)		ITEM		START (SEC)	STOP (SEC)
No. 3 SANGAMO No. 1 6.0 39. No. 4 SANGAMO No. 2 N/A SANGAMO No. 2 N/A 33.2 SANGAMO No. 1 24.10 14.0	2	CAMERA No		NO			O-GRAPH		-	MAK.	MAN.
No. 3		Ž	5.2				SANGAM	0 No. 1		6.0	39.0
SABIS SEQ. N/A 14.1057.W/G SABIS SEQ. N/A CALORIMETER (SABIS) 28.10 33.2 SABIS INST. CALORIMETER (SLOW SHUTTER) 10.0 14.0 19.0		ž	5, 3	3			SANGAM	O No. 2		NIA	
SABIS INST. SABIS INST. SABIS INST. CALORIMETER (SLOW SHUTTER) 10.0 14.0 14.0 19.1 19.2 19.1		ž		"			SABTS SEC	ď		WIA	
FECT MIRROR AND OF 2	GULL	וסבומם		, ,			CALORIM	ETER (SABTS)		28.10	33.20
	FEFE	-	1	1	+		CALCKIM	E IEK (SLOW S	TOI IER	1 -	14.0
		1	WIND WAR	5				-			\

LASER PERFORMANCE ANALYSIS, RUN VLI-283

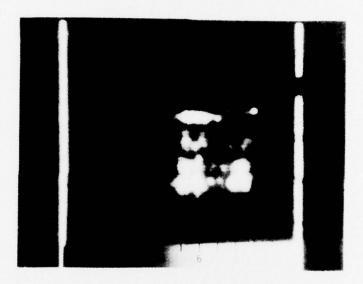
BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

LINEAR PROFILE*

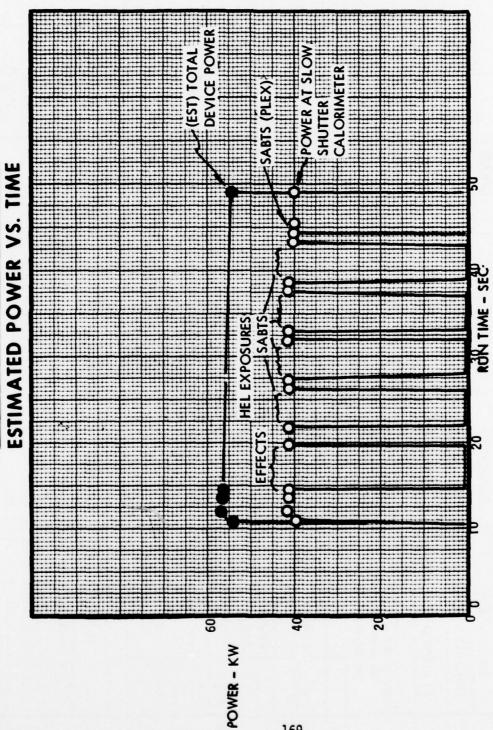
APPROX. TIME (SEC) NA



LEU BERGERSON

BEAM DIAGNOSTICS ENGINEER

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-284



PREPARED BY:

REMARKS:

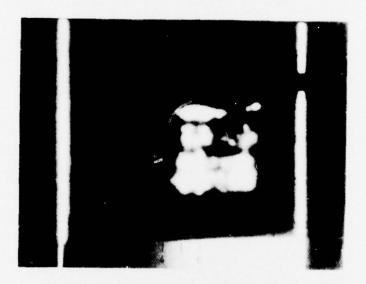
					QUICK LOOK TEST DATA	K TEST DATA				
RUN NO.	10. 1711 - 284		6	7	DATE 2-27	7-77	TIME	1000		
D2 FIRE VALVE OPEN (SEC)	1VE 9.9		D2 FIRE VALVE CLUSED (SEC)	49.0	LASING DUKATION (SEC)	9.04	TOTAL COMPLETED IEST POSITIONS		PLATINED TOTAL PVIE.	PVIR. 59
PLANNED		I NO. 5%	TEST NO. Sun 3 / GRAN SIME LINES	LINES		AS OF	DAI	E 2-26-7	DATE 2.26.77 REVISION	8
EXPERIMENTER D. A.	MENTER D. MULLEN P. RAGLIN	33	PLANNED LINEAR MAGNIFICATION PLANNED FEAK	INEAR VIION Y 30 /	30 KW /CM?	CONFIGURATION REFLEC CIRALIS	MISS			
			PLANNED				AC	ACTUAL		
TEST POSITION	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSURE)	ME IIME FROM	SLICE	EST, PWK. Al TAKGEI	TOTAL	ACTUAL SPOT DIAMETER	CONAMENIS
-	SAKS		6.0	1.10	14.00	13.0		57.6		
1.	1800		3.0	1.10	21.10					
-	-									
	R	HIVOHICIDOL		1.70	25.20	1				
1		-	4.0	1.70	30.40					
•	7	2	4.0	1.10	36.60	-				
		PLEKI	0.7	777	48.00	47.8		26.9		
	ITEM		STAKT (SEC)	\$	STOP (SEC)		IEM		STAKT (SEC)	STOP (SEC)
2	TV CAMERA No. 1		NO	-		O-GRAPH			MAN!	WAN.
	Ž	Zo. 2	"			SANGAMO No.	O No. 1		6.0	53.0
	Ž	No. 3	"			SALIGAMO No.	10 No. 2		NIA	
	Ž	₹.	"			SABTS SEQ.	G		16.0	
SAL	GVILLOTINE SABIS IPIST.		END OF			CALCRIM	CALCRIMETER (SABIS) CALCRIMETER (SLOW SHUTTER)	1	25.2	48.0
EFFE	EFFIRETS MIRROR	_	END OF	7					24 1	25.
WI FLOW	DW SOL	-	21.0						100	52

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

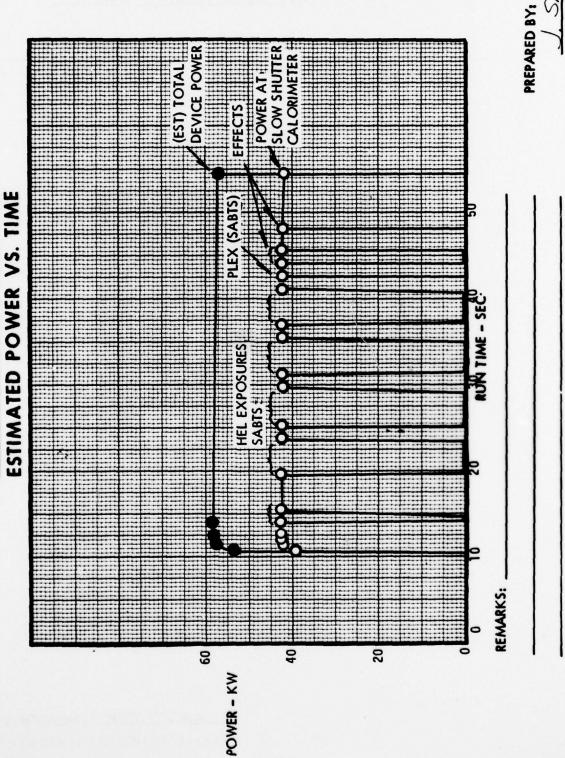
APPROX. TIME (SEC) N/A



LIN BARGERSON

BEAM DIAGNOSTICS ENGINEER

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-285
ESTIMATED POWER VS. TIME



					QUICK LOOK TEST DATA	TEST DATA				
RUN NO.	7-265	TEST FLAN	- Z	1	DATE 7.28-	3-77	TIME	21.47		
D2 FIRE VALVE OPEN (SEC)			D2 FIRE VALVE CLOSED (SEC)	545	LASING DUKATION (SEC)		TOTAL COMPLETED TEST POSITIONS	9	PLANNED TOTAL PWR.	W. 59
PLAN	NED TES	I NO.06	PLANNED TEST NO. OF 20/MINE LINES	LINES		AS OF	DATE	2.28-	2-28-7REVISION	a
EXPERIMENTER D. ML	D. MULL EN	3	PLANNED LINEAR MAGNIFICATION PLANNED FEAK	INEAR STON	3.1 = 25 KWENZ	CONFIGURATION TREFLEC TRANS	JRATION REFLECTIVE TRANSMISSIVE			
			PLANNED				ACTUAL	UAL		
TEST POSITION	SPECIMEN NO.	COATING		TRANSIT TIME (POST EXPOSUKE)	ME TIME FROM	TIME	EST. PWK. AT TARGET	TOTAL	ACTUAL SPOT DIAMETER	COMMENTS
-1	*	DOFS	4	1.70	14.00	14.0		58.9		
		DOF 6	+	1.70	19.70					
¥		HOUSE 107	-	1.70	31.10					
5	*	HOUSE 103		1.70	36.80					
0 1		PLEXI		1.10	42.50					
00	ANTI		20	1.10	4270					
6	BALCOL		3.0		47.50					
0)					50.80	54.5		57.9		
	iTEM		START (SEC)		STOP (SEC)		ITEM		STAKT (SEC)	STOP (SEC)
2	TV CALMERA 140. 1		NO			O-GRAPH			MAN.	Men.
	Ź	Ze. 2	"			SANGAMO No. 1	1 % C		6.0	52.0
	Z	No. 3	"			SANGAMO No.	0 No. 2		NIA	
	Ž	Zc. 4	"			SABTS SEQ.			NIA	
WILLE	GUILLOTINE		END OF 8			CALOKIMI	CALOKIMETER (SABTS)		14.0	42.5
SAE	SABTS INST.					CALORIM	CALORIMETER (SLOW SHUTTER)	HUTTER)	0.01	14.0
SEEE	EFFECTS MIRROR		SND OF 6				"	"	50.8	25.0
131 11	VI GLOW COIFUNIO	_			033	20/10	100000		42.0	0.55

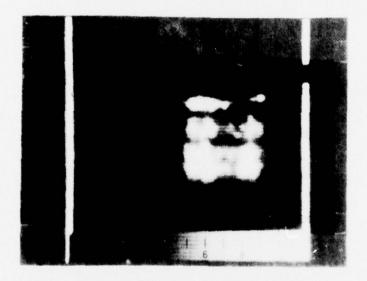
LASER PERFORMANCE ANALYSIS, RUN VL1-285

BEAM INTENSITY PROFILE

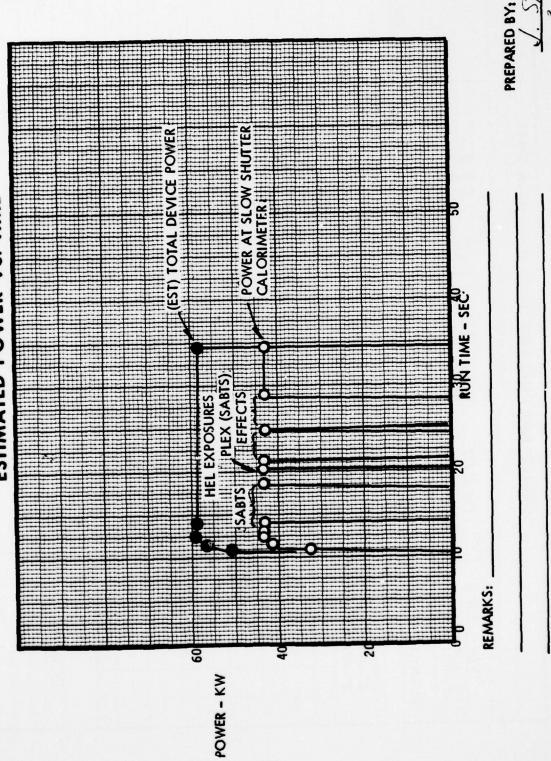
AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) 20

APPROX. TIME (SEC) N/A



LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-286
ESTIMATED POWER VS. TIME



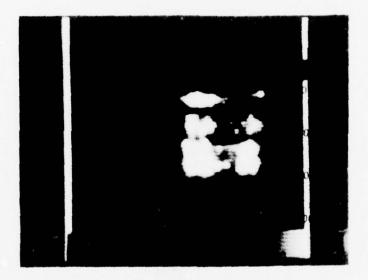
					QUICK LOOK TEST DATA	C TEST DATA				
# 140.		286 7	PLAN SABI	7	DATE 2.28	.28-77	TIME 2	2333		
OFFIT (SEC)		9.9	CLOSED (SEC)	34.5	LASING DUKATION (SEC)	24.6	TOTAL COMPLETED JEST POSITIONS	WALETED A	PLANNED TOTAL PUR.	FUR. 59
PLAN	NED TE	PLANNED TEST NO. OE21/NG	EZI/WG/TIM	TIME LINES		AS OF	DAT	£ 2-28-7	DATE 2-28-77 REVISION	270
EXPENSENTED DO AT	D. ATULL ON T. ROSZHART	SAN	PLANNED LINEAR MAGNIHICATION PLANNED FEAK HWR DENSITY		3.1 25/cW/cm2	CONFIGURATION KREFLEC GRAPS	JRATION KREFLECTIVE FRANSMISSIVE			
			PLANNED				ACI	ACTUAL		
TEST POSITION	SPECIMEN NO.	COATITUG		IKANSIT TIME (POST EXPOSURE)	INE FROM	TIME	EST. PWR. Al lakGEI	101AL POWER	ACTUAL SPOT DIAMETER	COMMENTS
- 1	*	HVGHES	3 4.0	4.00	14.00	13.5		24.7		
-	SPAMI		3.0	1.10	23.80					
5	1911	15.21.54								
					2	33.5		59.3		
	ITEM		START (SEC)		STOP (SEC)		ITEM		START (SEC)	STOP (SEC)
2	TV CAMERA NO.		70	-		O-GKAPH		-	MAN.	MAK
	2	Pk. 2	-			SANGAMO No.	- °% 0		6.0	37.0
	2	No. 3	11			MOVIE	CAMBRA	•	22.0	35.0
	2	7º.	"			SABTS SEQ.	Ö		WIA	
SWILL	GULLIO TUNA SABIS INST.		KND OF 4			CALORIM	CALORIMETER (SABTS) CALORIMETER (SLOW SHUTTER)	HUTTER	14.0	19.7
EFFECTS	•	MIRROR	ENO OF	2		"	-	"	19.8	23.8
					,,,,				0	010

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING STOON O TURN FLAT

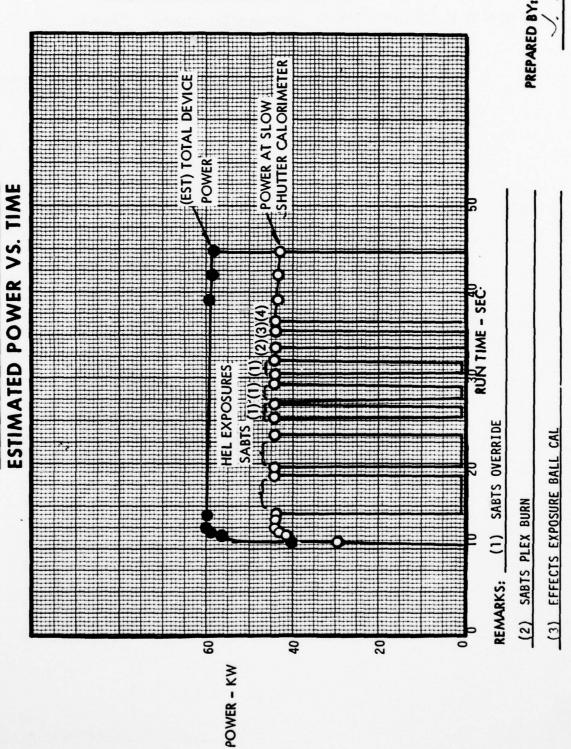
APPROX. TIME (SEC) 20

APPROX. TIME (SEC) N/A



LEE BERGERSON

LASER PERFORMANCE ANALYSIS - RUN NUMBER VL 1-287



(4) EFFECTS EXPOSURE NC2

NUN NO. 12.1 − 2 B 7 12.1 − 2 B 7 12.1 − 2 B 7 13.1 − 2 B 7 14.2 − 2 B 7 15.1 −	TIME		
# DOF 6 (\$ 4 \) # DOF 6 (\$ 6 \) # DOF 5 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 5 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 7 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 7 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 7 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 7 (\$ 6 \) # DOF 6 (\$ 6 \) # DOF 7 (\$ 6 \) # DOF 6 (\$ 7 \) # DOF 6 (\$ 7 \) # DOF 6 (\$ 7 \) # DOF 6 (\$ 7 \) # DOF 6 (\$ 7 \) # DOF 6 (\$ 7 \) # DOF 6 (\$	022	4	
D TEST NO. 0€22/M6/TIME LINES PLANNED HINEAR 3. PLANNED PEAK 2. PLANNED	34.8 TEST POSITIONS	PLANNED TOTAL PVR.	80
COMEN PLANNHED LINEAR 3.	AS OF DATE 2-2	2-28-77REVISION O	ORIG
SPECIMEN COATING EXPOSURE RANSIT TIME (POST NO. DESIGN TIME (SEC) EXPOSURE) ** DOF 6 (A) 4.0 1.70 ZA, C. 30 (T) 4.0 1.70 \$\frac{5}{5}\frac{6}{17}\frac{4}{17}\frac{1}{17}\frac{6}{17}\frac{1}{17}\frac{1}{17}\frac{6}{17}\frac{1}{17}\frac{1}{17}\frac{6}{17}\frac{1}{17}\frac{1}{17}\frac{6}{17}\frac{1}{17}\frac{1}{17}\frac{1}{17}\frac{6}{17}\frac{1}{17}\f	CONFIGURATION MERTECTIVE METRANSMISSIVE		
SPECIMEN COATING EXPOSURE [RANSII TIME (POSI NO.) ** DOF 6 (R) 4.0 1.70 ** DOF 5 (R) 4.0 1.70 ** OCLI 23 (T) 4.0 1.70 ** OCLI 24 (T) 4.0 1.70	ACTUAL		
	TIME EST. PWR. TOTAL SLICE AT TARGET POWER	ACTUAL SPOT B DIAMETER	COMMENTS
Tope 5(R) 4.0 1.70 Znse 30(T) 4.0 1.70 Znse 30(T) 4.0 1.70 Znse 30(T) 4.0 1.70 Little Drex! 0.1 1.10 Ne 1 45° Test 3.0 Item start (sec) 310r Volumera Nu. 1 0N	0.09 2.51	0	
ZnSe 30(T) 4.0 1.70 1.70 2.6 20.0 1.70			
\$\langle \frac{5,F380}{\times \text{CLI}} \frac{4,0}{4,0} \ \langle \frac{1,70}{1,20} \\ \langle \frac{1,20}{\text{CLI}} \frac{23}{\text{CLI}} \frac{4,0}{4,0} \\ \langle \langle \frac{1,10}{1,10} \\ \langle \frac{1,10}{\text{AG_I}} \frac{45^{\text{CRS}T}}{\text{FST}} \frac{5,0}{\text{CAMERA NU. I}} \text{START (SEC)} \text{STOP} \\ \langle \text{STOP} \\ \langle \text{START (SEC)} \text{STOP} \\ \langle \text{STOP}			
# OCLI 23 (T) 4,0 1,10 1			
DALCH DLEX! 0.1 1.10			
BALCAL 45° TEST 3.0 1.10			
NE 45° TEST 3.0 1110 1110 1100 1	43.2	+	
ITEM STAKT (SEC) STOP (
STAKT (SEC)			
	ITEM	START (SEC)	STOP (SEC)
	O-GRAPH	MAN.	MAN.
No. 2	SANGAMO No. 1	6.0	57.0
140, 3	SANGAMO No. 2	MIA	
No. 4	SABIS SEQ.	NIA	
. 67	CALONIMETER (SABTS)	(4.0	42.5
<u></u>	IMETER (SLOW STIC	200	13.0
MEETITY MINNOR WIND OF 6	MOVIN CAMERA	42.0	25.0

LASER PERFORMANCE ANALYSIS, RUN VL1-227

BEAM INTENSITY PROFILE

AS SEEN BY IR CAMERA VIEWING SECOND TURN FLAT

APPROX. TIME (SEC) N/A

APPROX. TIME (SEC)

NO DATA - BOL TIMBER TIMBED OUT DIBITAL RECORDER